September 2023 Oil and Gas Lease Parcel Sale

DOI-BLM-MT-0000-2023-0002-EA

September 2023

U.S. Department of the Interior
Bureau of Land Management
Montana / Dakotas State Office
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The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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1 Introduction

1.1 Summary of Proposed Project

This environmental assessment (EA) was prepared to thoroughly examine the potential environmental impacts of the proposed action and alternative actions to support informed decision-making. This analysis is consistent with the purpose and goals of NEPA; the requirements of the Council on Environmental Quality's (CEQ) implementing NEPA regulations at 40 CFR Parts 1500-1508; longstanding federal judicial and regulatory interpretations; the Department of the Interior's NEPA regulations (43 CFR Part 46); and Administration priorities and polices including Secretary's Order No. 3399 requiring bureaus and offices to use "the same application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect."

This EA has been prepared to disclose and analyze the potential environmental consequences from leasing 32 lease parcels encompassing approximately 10,735.41 Federal mineral acres located across the Montana/Dakotas in the BLM North Dakota Field Office (NDFO) within the administrative boundary of the Dakota Prairie Grasslands (DPG) McKenzie Ranger District. If found to be eligible and available, the parcels would be included as part of a competitive oil and gas lease sale tentatively scheduled to occur during September of 2023 and offered. The proposed parcels are in McKenzie County in North Dakota. Refer to parcel maps in **Appendix C**.

The Bureau of Land Management (BLM) Montana/Dakotas State Office conducts Oil and Gas Federal mineral estate lease auctions for lands managed by the Federal Government, whether the surface is managed by the Department of the Interior (BLM or Bureau of Reclamation (BOR)), United States Forest Service (USFS), or other departments and agencies. These auctions also include split estate lands, where the BLM holds subsurface mineral rights, but a party other than the Federal Government owns the surface estate. The Montana/Dakotas State Office has historically conducted four lease sales per year. The BLM's authority to conduct these lease sales is based on various laws including the Mineral Leasing Act (MLA) of 1920, as amended, and the Federal Land Policy and Management Act (FLPMA) of 1976. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 Sec. 5102(a)(b)(1)(A) directs the BLM to conduct quarterly oil and gas lease sales in each state whenever eligible lands are available for leasing.

Members of the public file Expressions of Interest (EOI) for leasing by the BLM. The BLM may also submit a parcel if an existing well is draining Federal minerals or for other reasons. From these EOIs and BLM nominations, the Montana/Dakotas State Office prepares a preliminary parcel list and provides them to the field offices for review. The BLM also reviews parcels located in designated greater sage-grouse habitat to guide development to lower conflict areas and protect important habitat consistent with conservation objectives in the 2015 Rocky Mountain Region Record of Decisions and the applicable Approved Resource Management Plans (ARMPs), a court order in the U.S. District Court for the District of Montana (case 4:18-cv-00069-BMM filed 5/22/20), and Montana/Dakotas Instruction Memorandum MT-2020-018. During the parcel screening process, the Montana/Dakotas BLM interdisciplinary team reviews the parcels, and evaluates:

1. If they are in areas open to leasing;

2. If new information has come to light which might change previous analyses conducted during the land use planning process;

3. Whether there are site specific resource concerns that warrant not leasing a particular parcel,

4. If there are special resource conditions of which potential bidders should be made aware; and,

5. Which stipulations should be identified and included as part of a lease.

If the decision is made to offer lease parcels, the Montana/Dakotas State Office would publish a Notice of Competitive Oil and Gas Lease Sale (Sale Notice) at least 45 days before the auction is held. The Sale Notice will identify applicable lease stipulations for each parcel.

The offering and subsequent issuance of oil and gas leases would not result in ground disturbance. However, once a lease is sold the lessee maintains the right to occupy, explore for, and develop oil and gas resources from the lease consistent with the lease terms and conditions and upon approval of a site-specific permit by the BLM authorized officer. These lease operations can result in surface-disturbance and other impacts.

In accordance with BLM Handbook H-1624-1 ("Planning for Fluid Mineral Resources" January 28, 2013), the Federal Government retains certain rights when issuing an oil and gas lease. While the BLM may not unilaterally add a new stipulation to an existing lease that it has already issued, the BLM can subject development of existing leases to reasonable conditions, as necessary, through the application of Conditions of Approval (COAs) at the time of permitting. The new constraints must be in conformance with the applicable land use plan and not conflict with rights granted to the holder under the lease. See 30 U.S.C. § 226(g); 43 CFR § 3101.1-2. See also *Yates Petroleum Corp*., 176 IBLA 144 (2008); *National Wildlife Federation*, 169 IBLA 146, 164 (2006).

BLM Montana / Dakotas has prepared this EA for the September 2023 oil and gas lease sale, which considers two alternatives:

- Alternative A: No Action
    - The nominated parcels would not be offered for lease as part of a competitive oil and gas lease sale.
- Alternative B: Proposed Action
    - The BLM would offer 32 nominated lease parcels encompassing approximately 10,735.41 Federal mineral acres as part of a competitive oil and gas lease sale in the BLM North Dakota Field Office within the administrative boundary of the Dakota Prairie Grasslands McKenzie Ranger District.

The BLM assigned lease stipulations, as developed through the RMP process, to the parcels to address resources concerns. A Federal oil and gas lease would be issued for a 10-year period and would remain valid for as long thereafter as oil or gas is produced in paying quantities, required payments are made and lease operations are conducted in compliance with regulations and approved permits. If a lessee fails to produce oil and gas by the end of the initial 10-year period, does not make annual rental payments, or does not comply with the terms and conditions of the lease, the BLM will terminate the lease. The lessee can relinquish the lease. The oil and gas resources could be offered for sale at a future lease sale. Drilling of wells on a lease would not be permitted until the lessee or operator secures approval of a drilling permit and a surface use plan as specified in 43 CFR § 3162. This requires additional environmental reviews, by the BLM, at the time of application.

1.1 Purpose and Need

The purpose and need for this action are to respond to EOIs to lease parcels of land for oil and gas development as required by Federal laws, including the MLA, FLPMA, and Federal Onshore Oil and Gas Leasing Reform Act of 1987.

Offering parcels for competitive oil and gas leasing provides opportunities for private individuals or companies to explore and develop federal oil and gas resources after receipt of necessary approvals, and to sell the oil and gas in public markets.

1.2 Decision to be Made

Based on this review and public comment, the BLM will determine whether to make lands available for leasing, and, if so, identify stipulations that would be included with specific lease parcels at the time of lease sale.

1.3 Land Use Plan Conformance

Pursuant to 40 CFR § 1508.28 and § 1502.21, this EA is tiered to the information and analysis and conforms to the decisions contained in the North Dakota RMP of April 1988. This plan is the governing land use plans for their respective geographic areas. The lease parcels to potentially be offered for sale are within an area determined to be open to oil and gas leasing in the RMPs. An electronic copy of these planning documents is available via the internet on the BLM e-Planning page: https://www.blm.gov/programs/planning-and-nepa/eplanning.

This EA is also tiered to the information and analysis and conforms to the decisions contained in the Dakota Prairie Grasslands Northern Great Plains Management Plans Revision Final Environmental Impact Statement for Oil and Gas Leasing (December 2020) and Record of Decision Oil and Gas Leasing USDA Forest Service Little Missouri National Grassland, Dakota Prairie Grasslands (December 2020). Additionally, this EA is tiered to the BLM Record of Decision Adopting USDA Forest Service Final Supplemental Environmental Impact Statement for Oil and Gas Leasing, Little Missouri National Grassland, Dakota Prairie Grasslands (DOI-BLM-MT-2021-0001-OTHER_NEPA). This conformance applies only to the parcels on USDA Forest Service managed surface located within the administrative boundaries of the USDA Forest Service Dakota Prairie Grasslands.

In an opinion and amended order on March 26, 2018, the U.S. District Court for the District of Montana found that the BLM violated NEPA in the Final EISs for the Buffalo and Miles City RMPs (*Western Organization of Resource Councils (WORC) et al. v. BLM, Case 4:16-cv-00021-BMM, filed 3/23/18)*) with respect to consideration of the amount of coal made available for lease and consideration of climate change impacts. On July 31, 2018, the District Court issued an order directing the BLM to prepare a Supplemental EIS for the RMP, and to complete comprehensive environmental analysis in compliance with the Court's March 26, 2018, Order, and all existing procedural requirements under NEPA and the Administrative Procedures Act (APA) for any new or pending leases of coal, oil, or gas resources in the planning areas subject to the Buffalo RMP and the Miles City RMP. Miles City prepared a Supplemental EIS and approved a Resource Plan Amendment in November 2019, but it was later set aside as unlawful in an order from the U.S. District Court for the District of Montana Great Falls Division on 10/16/20 (Case 4:20-cv-00062-BMM, finding that the Acting BLM Director had not been properly appointed to the position and did not have the authority to resolve protests on the RMP amendment). The BLM has prepared the September 2023 Oil and Gas Lease Sale EA in compliance with the terms of the WORC Order, NEPA, and the APA.

1.4 Relationship to Statutes, Regulations, Other NEPA Documents

The mandate of the BLM is derived from various laws, including the MLA and the FLPMA, as amended, to promote the exploration and development of oil and gas on the public domain. Additionally, the Federal Onshore Oil and Gas Leasing Reform Act of 1987 states lease sales shall be held for each State where eligible lands are available at least quarterly and more frequently if the Secretary of the Interior determines such sales are necessary.

The Inflation Act (IRA) of 2022 introduced several changes that affect oil and gas leasing on Federal lands. Section 50262 of the IRA updates the MLA, increasing onshore oil and gas royalty rates from 12.5 percent to 16.67 percent for newly issued leases, increasing onshore oil and gas leasing minimum bids from $2 per acre to $10 per acre, and increasing oil and gas rental rates from $1.50 per acre for years 1-5 and $2 for years 6-10 to $3 per acre for years 1-2, $5 for years 3-8, and $15 for all years after. In addition, it introduced a fee for submitting expressions of interest for oil and gas leasing of $5 per acre and eliminated noncompetitive leasing. Section 50265 establishes that the Secretary of the Interior may not issue a right-of-way for wind or solar energy development on Federal land unless a) an onshore lease sale has been held during the 120-day period ending on the date of the issuance of the right-of-way for wind or solar energy development; and b) the sum total of acres offered for lease in onshore lease sales during the 1-year period ending on the date of the issuance of the right-of-way for wind or solar energy development is not less than the lesser of 2,000,000 acres; and 50 percent of the acreage for which expressions of interest have been submitted for lease sales during that period.

Purchasers of oil and gas lease parcels are required to comply with all applicable Federal, State, and local laws and regulations, including obtaining all necessary permits prior to any lease development activities. Stipulations attached to the lease, restrictions deriving from specific, nondiscretionary statues, and such reasonable measures may be required to minimize adverse impacts to other resource values (43 CFR § 3101.1-2).

The regulations, policies, and plans utilized in preparing this EA include, but are not limited to the following:

- 43 CFR § 3100 – Oil and Gas Leasing
- BLM Manual 3120 – Competitive Leasing
- BLM Competitive Leasing Handbook (H-3120-1)
- Directional Drilling into Federal Mineral Estate from Well Pads on Non-Federal Locations (WO IM 2018-014)
- Impacts of the Inflation Reduction Act of 2022 (Pub. L. No. 117-169) to the Oil and Natural Gas Leasing Program (WO IM 2023-008)
- Oil and Gas Leasing – Land Use Planning and Lease Parcel Review (WO IM 2023-010)

❖ Evaluating Competitive Oil and Gas Lease Sale Parcels for Future Lease Sales (WO IM 2023-007): In accordance with Instruction Memorandum (IM) 2023-007, the BLM has evaluated the nominated lease parcels against five criteria to determine each parcel's leasing preference (see **Appendix J**). As a result, of the originally nominated parcels, 18 of the parcels were determined to be in very high development potential, 10 in high development potential, 7 having moderate potential, 17 having low potential, and 9 in very low development potential. Seven parcels were unevaluated, and subsequently removed from this lease sale due to pending litigation. Of all the parcels nominated, 36 were rated as low potential for leasing based on one or more criteria (proximity to development, proximity to habitat,

cultural resources, and development potential).

The IM states that the BLM will close all EOIs that have remained pending for three or more years, and that the State Office will notify each EOI submitter of a planned closure; the notice will provide 30-days for the EOI submitter to express a continuing interest in the EOI(s) which would result in the EOI remaining active. The BLM has initiated this contact period with the EOI submitter(s), which will run concurrently with the 30-day public comment period of this EA. A result of this inquiry will be reflected in the Decision Record as the BLM may remove parcels from this lease sale due to lack of interest.

The BLM originally included all 68 parcels in the public scoping period. As a result of the lease parcel evaluation and scoping comments, the BLM has decided through State Director discretion to defer 37 parcels (15,064.00 acres) from this lease sale to conduct further resource analysis related to development potential. Ten of these 30 parcels are also deferred for Greater sage-grouse habitat prioritization reasons. One parcel will be deferred because was submitted anonymously. Additionally, per 43 CFR § 3120.1-1(d), the BLM has identified lands which are subject to drainage; therefore, the BLM has self-nominated and included parcel ND-2023-09-6865 in this lease sale. As such, the proposed action that is analyzed in this EA includes offering 32 parcels encompassing 10,735.41 Federal mineral acres.

This EA also tiers to, and incorporates by reference, the June 2023 Oil and Gas Lease Sale EA DOI-BLM-MT-0000-2023-0001-EA. The BLM added parcel ND-2023-09-6865 to the September 2023 lease sale. Parcel ND-2023-09-6865 was previously included in the June 2023 BLM Oil and Gas Lease Sale as parcel ND-2023-06-0263 and was incorporated into the public scoping period from January 06, 2023, to February 09, 2023, as well as the June 2023 EA public comment period from March 10, 2023, to April 10, 2023. The BLM deferred this parcel from the June sale based on additional review associated with IM 2023-008 and 2023-007; the original nominator was no longer interested in the parcel. As per 43 CFR §3120.1-1(d), the BLM has identified that the lands associated with the parcel are subject to drainage; therefore, the BLM has self-nominated these lands and have included them as parcel ND-2023-09-6865 in the September 2023 lease sale.

This EA was prepared to thoroughly examine the potential environmental impacts of the proposed action in order to support informed decision-making. This EA is consistent with the purpose and goals of NEPA; the requirements of the Council on Environmental Quality's (CEQ) implementing NEPA regulations at 40 CFR § 1500-1508; longstanding federal judicial and regulatory interpretations; the Department of the Interior's NEPA regulations (43 CFR Part 46); and Administration priorities and polices including Secretary's Order No. 3399 requiring bureaus and offices to use "the same application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect."

1.5 Issues Identified for Analysis

Analysis issues include resource issues that could potentially be affected by oil and gas leasing. The BLM focuses its analysis on "issues that are truly significant to the action in question, rather than amassing needless detail" (40 CFR § 1500.1(b)). Consistent with Title 43 Code of Federal Regulations 3131.3, the BLM identified site-specific resource concerns and lease stipulations for proposed parcels through a preliminary review process conducted prior to a 30-day public scoping period. After scoping was completed, the BLM identified issues of concern identified by the public, determined how to address those concerns in this EA, and reviewed and edited lease stipulations as necessary. The following resources/issues will be analyzed in detail in this EA:

1.5.1 Issue 1 – Air Resources

What types of emissions would be generated from subsequent oil and gas development of leased parcels? What quantity of air pollutants would be produced based on the assumptions for analysis? How

would air pollutant emissions from subsequent development of leased parcels affect air quality?

- Indicator: Tons per well and tons per year of PM_{10}, $PM_{2.5}$, NO_X, SO_2, CO, VOCs, HAPs

How would air emissions from subsequent development of leased parcels affect visibility at Class I Airsheds?

- Indicator: Change in deciviews, which is a unit of measurement to quantify human perception of visibility. It is derived from the natural logarithm of atmospheric light extinction coefficient. One deciview is roughly the smallest change in visibility (haze) that is barely perceptible.

1.5.2 Issue 2 – Greenhouse Gases

How would future potential development of nominated lease parcels contribute to greenhouse gas (GHG) emissions and climate change?

- Indicator: Metric tonnes (t) or megatonnes (Mt), and social cost of GHGs ($)

1.5.3 Issue 3 – Socioeconomic Conditions, Environmental Justice, and Human Health

How would the leasing and potential development of these parcels affect local economic activity and revenues for federal, local, and state governments?

Would Environmental Justice populations be disproportionally adversely affected by the leasing of the proposed parcels?

- Indicator: Total revenue income and bonus bids over 10-year lease term
- Indicator: Disproportionate impacts from leasing parcels
- Indicator: Population groups of concern

Executive Order 12898 (Feb. 11, 1994), Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, provides that BLM shall identify and address disproportionately high and adverse human health or environmental effects on low- income populations, minority populations, or Indian tribes that may experience common conditions of environmental exposure or effects associated with a plan or project. McKenzie County, ND meets the threshold for identifying Environmental Justice populations.

- Indicator: Opportunity for meaningful involvement

Meaningful public engagement focuses on empowering vulnerable and affected populations to participate in decisions that have the potential to affect their lives, regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

1.5.4 Issue 4 – Water Resources

What are the effects of potential oil and gas development, including hydraulic fracturing, on parcels that may be offered for lease on surface and groundwater quality and quantity?

Indicator: Characterize the affected environment in the watersheds where parcels are proposed. Quantify estimated acres of surface disturbance and million gallons water used. Qualitatively assess effects to surface and groundwater resources from oil and gas development.

Cultural resources and Native American Religious Concerns

Consultation, collaboration, and coordination for the identification of cultural resources and mitigation of disturbance or detrimental effects is robust and ongoing and therefore will not be analyzed in detail in this analysis. The BLM has applied lease terms and stipulations to proposed parcels that include CR16-1 and STD 16-3 (see **Appendix B** for definitions). The result of the applying these stipulations at leasing provides protection to cultural resources. The BLM will not approve any ground disturbing activities that may affect such properties or resources until it completes its obligations associated with the stipulations that are applied to each respective parcel as well as applicable requirements of the National Historic Preservation Act and any other authorities. The BLM may require modification to exploration or development proposals to protect such properties or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated. Within the administrative boundaries of the USFS Dakota Prairie Grasslands, LMG2020-LN-03 is applied to protect these resources.

Native American Religious Concerns: Native American belief systems and traditional practices can vary widely across traditional tribal lands and require ongoing consultation and coordination to ensure that an action authorized by the BLM will not impede upon or impair practices or locations that are deemed as Traditional Cultural Properties or are otherwise important. The BLM applied CR 16-1 to all parcels that may have possible historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O 13007, or other statutes and executive orders. The purchaser of a lease is entitled to develop the parcel consistent with lease stipulations and must have an approved Application for Permit to Drill (APD), including a plan of operations and a review and consideration of Native American religious concerns, before ground disturbing activities can begin. The BLM may require modification to exploration or development proposals to protect unevaluated, eligible, or other such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

Chapter 4 contains a summary of consultation and coordination for this analysis, as well as a list of all tribal entities, governments, historic preservation officers and Bureau of Indian Affairs personnel contacted to participate in the writing of this EA.

1.6 Issues Identified but Eliminated from Further Analysis

The following resources/issues are not present and not considered in this EA: lands and realty conflicts, locatable and salable minerals, forest and woodland, cave and karst resources, wilderness study areas, ACECs, and wild and scenic rivers. Other resource issues BLM considered but eliminated from further analysis due to environmental impacts previously analyzed through prior NEPA reviews and/or lease notices or stipulations that were applied to avoid and minimize impacts are discussed below:

Greater Sage-grouse: The BLM screened parcels to determine if any parcels would affect sage-grouse habitat. Following the application of State Director discretion deferring 30 parcels from consideration, none of the remaining 32 parcels contain Greater Sage-grouse habitat.

Paleontology: The application of lease terms and the paleontological lease notices (STD 16-3, LN 14-12) at leasing provides protection to paleontological resources. The paleontological lease notice LN 14-

12 is applied to those lease parcels that fall within geological units with a PFYC Class of 3 or higher. Leased lands that fall into this category could require professional assessment which may include a field survey prior to surface disturbance. The results of the assessment and survey by a BLM- permitted paleontologist will serve as the basis for a mitigation plan during development. If the inventory resulted in the identification of paleontological resources, mitigation measures such as avoidance, professional monitoring, development of an Unanticipated Resource Discovery Plan or salvage would be initiated by BLM and the operator. Within the administrative boundaries of the USFS Dakota Prairie Grasslands LMG2020-LN-04 is applied to protect these resources.

Soils Resources and Vegetation: The Standard Lease Stipulation STD 16-3 has been applied to applicable parcels to mitigate any impacts associated with leasing or development of these parcels. At the time of exploration or development the APD surface use plan of operations will include design features and mitigation measures to reduce, avoid, or minimize potential impacts to soil and vegetative resources consistent with the RMP for the respective planning area. Within the administrative boundaries of the USFS Dakota Prairie Grasslands LMG2020-NSO-01 is applied to protect these resources.

Riparian – Wetland Habitats: The Standard Lease Stipulation STD 16-3 has been applied to applicable parcels to mitigate any impacts associated with leasing or development of these parcels. At the time of exploration of development, the APD surface use plan of operations will include design features and mitigation measures to reduce, avoid, or minimize impacts to riparian-wetland areas, consistent with the RMP for the respective planning area. Additionally, all stipulations related to setback distances from the edge of the wetlands, streams, and rivers will be adhered to and consistent with the RMP for the respective planning area. Within the administrative boundaries of the USFS Dakota Prairie Grasslands LMG2020-NSO-17, LMG2020-CSU-01, and LMG2020-LN-01 are applied to protect these resources.

Visual Resources: BLM is required to manage for visual resources on BLM owned surface lands. Each RMP contains Visual Resource Management (VRM) requirements and considerations specific for the geographical location to which they apply. VRM practices and standards will be implemented consistent with the respective RMP they are subject to. New oil and gas development would implement, as appropriate for the site, Best Management Practices (BMP's) to maintain visual qualities where possible. This includes, but would not be limited to, proper site selection, reduction of visibility, minimizing disturbance selecting color(s)/color schemes that blend with the background and reclaiming areas that are not in active use. Repetition of form, line, color, and texture when designing projects would reduce contrasts between landscape and development.

The application of Standard Lease Stipulation STD 16-3 would be sufficient at the leasing stage to notify operators that additional measures may be necessary to reduce visual impacts from potential future development (at the APD stage). This provides for the protection and conservation of the visual resources on public lands. BLM visual resource classifications are only applied to BLM surface. For non-federal surface lands where there are federal minerals (commonly referred to as split estate), BLM does not have the authority to manage for VRM. Therefore, within the administrative boundaries of the USFS Dakota Prairie Grasslands LMG2020-CSU-08 and LMG2020-CSU-09 are applied to protect these resources on USFS surface.

Recreation: No direct impacts to recreational opportunities would occur as a result of offering leases for sale. The leasing action would be considered in compliance with all relevant recreation regulations, protocols, and policies. Impacts on recreation from potential future exploration and development would be analyzed at the APD stage and included design features, and mitigation would be integrated to avoid or minimize potential impacts to recreation consistent with the RMP for the respective planning area. Within the administrative boundaries of the USFS Dakota Prairie Grasslands, LMG2020-CSU-07, LMG2020-NSO-12, LMG2020-NSO-13, LMG2020-NSO-14, and LMG2020-TL-07 are applied to

protect these resources.

Wildlife:

Aquatic Species and Terrestrial Wildlife: The BLM screened parcels for sensitive species and species of concern and applied timing limit, controlled surface use, and no surface occupancy lease stipulations to avoid/minimize impacts to species. Within the administrative boundaries of the USFS Dakota Prairie Grasslands, LMG2020-NSO-04, LMG2020-NSO-05, LMG2020-NSO-07, LMG2020-NSO-08, LMG2020-NSO-09, LMG2020-CSU-02, LMG2020-CSU-04, LMG2020-TL-01, LMG2020-TL-03, and LMG2020-TL-05 are applied to protect these resources.

Threatened and Endangered Species: The BLM placed stipulation TES 16-2 (Endangered Species Act Section 7 Consultation) on parcels, which states that the BLM may require modifications to, or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. Within the administrative boundaries of the USFS Dakota Prairie Grasslands LMG2020-LN-02 is also applied to protect these resources.

These notices state that a biological evaluation of the leased lands may be required prior to surface disturbance to determine if endangered, threatened, proposed, candidate or sensitive plant or animal species or their habitat are present within the administrative boundaries of the DPG. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation. The BLM completed a screen for threatened and endangered species and habitat presence in proposed parcels and identified applicable stipulations if the species or habitat may be present. Refer to **Table 1** below.

All parcels have been reviewed by the USFS and North Dakota Fish and Game biologists. The BLM and USFS has applied additional stipulations in compliance with the recommendations from the state agencies for applicable measures to protect sensitive species.

Table 1. USFWS Listed Species and Habitat occurrence in proposed MT/Dakotas September 2023 Oil and Gas Lease Sale

Scientific Name	Common Name	Status	Species Present in Lease Parcels	Suitable Habitat Present	If species and/or habitat are present, identify stipulations that would avoid/minimize impacts to the species.
McKenzie County, ND					
Charadrius melodus	Piping plover	LE	No	No	TES 16-2
Calidris canutus rufa	Red Knot	LT	No	No	TES 16-2
Grus americana	Whooping Crane	LT	Unknown	Unlikely	TES 16-2
Scaphirhynchus albus	Pallid Sturgeon	LE	No	No	TES 16-2
Hesperia dacotae	Dakota Skipper	LT	No	Unknown	TES 16-2
Danaus plexippus	Monarch Butterfly	C	Unknown	Yes	TES 16-2
C = Candidate PCH = Proposed Critical Habitat LT = Listed Threatened CH = Designated Critical Habitat LE = Listed Endangered P = Proposed XN = Experimental non-essential population					

2 Alternatives

This EA considers the effects of two alternatives: Alternative A – No Action and Alternative B – Proposed Action. The Proposed Action is based upon Expressions of Interest (EOIs) that were

submitted to the BLM for the September 2023 lease sale.

2.1 Alternative A – No Action Alternative

Under the No Action alternative, none of the EOIs to lease (parcel nominations) would be offered for sale. The No Action Alternative would exclude all parcels from the competitive oil and gas lease sale. No additional natural gas or crude oil would enter the public markets, and no royalties would accrue to the federal or state treasuries from the proposed parcel lands. The No Action Alternative would result in the continuation of the current land and resource uses on the lease parcels and would remain the same as the affected environment described in Chapter 3. Existing Federal leases for oil and gas properties would continue to generate rental income.

2.2 Alternative B - Proposed Action Alternative

The BLM would offer 32 lease parcels encompassing approximately 10,735.41 Federal mineral acres as part of a competitive oil and gas lease sale tentatively scheduled to occur on September 12, 2023, in conformance with the existing land use planning decisions. A BLM and USFS interdisciplinary team reviewed all the parcels and applied stipulations and lease notices designed to avoid or minimize impacts to resources. These stipulations are summarized below, and detailed in **Appendix A** and **B** of this EA.

- Dakota Prairie-Grasslands Administrative Boundary: 32 parcels on USFS surface in McKenzie County (10,735 acres).

No Surface Occupancy Stipulations (NSO):
Use or occupancy of the land surface for fluid minerals exploration or development and all activities associated with fluid minerals leasing are prohibited to protect identified resource values. The NSO stipulation is a category of major constraints. NSO areas are open to fluid minerals leasing, but surface occupancy or surface disturbing activities associated with fluid minerals leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require directional drilling or drilling from outside the boundaries of the NSO area. This differs from areas identified as closed to leasing in which neither the surface area nor mineral estate is available for fluid minerals leasing.

Within the Dakota Prairie-Grasslands administrative boundary, BLM and USFS applied NSO stipulations from the 2020 Little Missouri Grasslands/Dakota Prairie Grasslands Oil and Gas Leasing Decision:

- LMG2020-NSO-01 to protect slopes greater than 40 percent;
- LMG2020-NSO-04 to protect prairie falcon and burrowing owl nests;
- LMG2020-NSO-05 to protect golden eagle, merlin, and ferruginous hawk nests;
- LMG2020-NSO-07 to protect sharp-tailed grouse display grounds;
- LMG2020-NSO-08 to protect black-footed ferret reintroduction habitat;
- LMG2020-NSO-09 to protect bighorn sheep habitat;
- LMG2020-NSO-12 to protect developed recreation sites;
- LMG2020-NSO-14 to protect inventoried roadless areas;

Controlled Surface Use Stipulations (CSU):

CSU is a category of moderate constraint stipulations that allows some use and occupancy of public land while protecting identified resources or values. CSU areas are open to fluid minerals leasing, but

the stipulation allows the BLM to require special operation constraints.

BLM and USFS applied CSU stipulations to all or portions of parcels within the Dakota Prairie-Grasslands administrative boundary from the 2020 Little Missouri Grasslands/Dakota Prairie Grasslands Oil and Gas Leasing Decision:

- LMG2020-CSU-01 to avoid and/or minimize impacts to water, wetlands, woody draws, riparian areas, and floodplains;
- LMG2020-CSU-04 to protect Bighorn sheep habitat;
- LMG2020-CSU-07 to protect inventoried roadless areas;
- LMG2020-CSU-08 to protect high scenic integrity objective areas;
- LMG2020-CSU-09 to protect moderate scenic integrity objective areas;

Timing Limitation Stipulations (TL):
Areas identified for TL, a moderate constraint, are closed to fluid minerals exploration and development, surface-disturbing activities for periods that may exceed 60 days. This stipulation does not apply to operation and basic maintenance.

Within the Dakota Prairie-Grasslands administrative boundary, BLM and USFS applied TL stipulations from the 2020 Little Missouri Grasslands/Dakota Prairie Grasslands Oil and Gas Leasing Decision:

- LMG2020-TL-01 to protect sharp-tailed grouse display grounds;
- LMG2020-TL-03 to protect bighorn sheep lambing areas;
- LMG2020-TL-05 to protect developed Pronghorn Antelope winter range;

Lease Notices
A lease notice (LN) provides more-detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. An LN also addresses special considerations for lessees when they plan their operations, but it does not impose additional restrictions. LNs are not an RMP-level decision, and new LNs may be added to fluid minerals leases at the time of sale. Within the proposed lease parcels the BLM applied the following Lease Notices:

- For paleontological resources (LN 14-12),
- For air resources (LN 14-18),

Within the Dakota Prairie-Grasslands administrative boundary, BLM and USFS applied lease notices, in addition to the ones listed above, as addressed in the 2020 Little Missouri Grasslands/Dakota Prairie Grasslands Oil and Gas Leasing Decision:

- LMG2020-LN-01 to notify lessees of additional inventory, protection and avoidance requirements for floodplains and wetlands;
- LMG2020-LN-02 to notify lessees that the lease may contain threatened and endangered plant and animal species or habitat;
- LMG2020-LN-03 to notify lessees that the leased lands may contain cultural resources;
- LMG2020-LN-04 to notify the lessees that the leased lands may contain paleontological resources;
- LMG2020-N-01, the standard agency lease notice, was also applied to these parcels.

The application and definitions of all stipulations can be found in **Appendix A** and **B**.

Based upon calculations made in the Reasonably Foreseeable Development Scenarios, the BLM

estimates that 12 new oil wells could be drilled in the North Dakota Field Office from this lease sale. Refer to **Appendix D.**

2.3 Alternatives Considered but not Analyzed in Detail

NEPA requires the BLM to consider a reasonable range of alternatives to the proposed action. In this EA, the BLM considers one Action alternative and the No Action alternative. The alternatives would lease, or not lease parcels based upon specific resource concerns identified during analysis. The BLM received scoping comments asking for alternatives that did not fall within the range of alternatives already analyzed in the EA, including:

- An alternative that protects groundwater.

The BLM frequently receives comments asking for an alternative that would protect usable groundwater, defined under the Safe Drinking Water Act as an aquifer with water that contains less than 10,000 mg/L (10,000 ppm) of total dissolved solids. However, a separate alternative to protect usable groundwater is not warranted because protection of groundwater would be required for any APD that is approved on a lease parcel. Authorization of proposed projects would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection, and the BLM would deny any APD that proposes drilling and/or completion processes that are insufficient to protect usable water, as required by 43 CFR § 3162.5-2(d). Any proposed drilling/completion activities would have to comply with Onshore Order No. 2 and 43 CFR § 3160 regulations, and not result in a violation of a Federal and/or State laws that prohibit degradation of surface or groundwater quality.

- An alternative that that minimizes methane waste through both technology and regulatory authority.

Lease Notice 14-18 is applied to every BLM-administered parcel, which provides: The lessee/operator is given notice that prior to project-specific approval, additional air resource analyses may be required to comply with the NEPA, FLPMA, and/or other applicable laws and regulations. Analyses may include equipment and operations information, emission inventory development, dispersion modeling or photochemical grid modeling for air quality and/or air quality related value impact analysis, and/or emission control determinations. These analyses may result in the imposition of additional project-specific control measures to protect air resources. Application of the lease notice allows the BLM to mandate site-specific analysis of impacts to air resources at the APD stage, and to require project-specific control measures to protect air resources, including methane reduction technologies. As the BLM cannot write additional stipulations at the leasing stage, and methane reduction technologies may be required under LN 14-18, this alternative is therefore eliminated from further analysis.

2.4 General Information and Appendices

Appendix A provides a list of all the parcels by parcel number, and identifies the size, legal descriptions, and associated stipulations. **Appendix B** provides a description of Lease Stipulations and **Appendix C** identifies the location of each parcel.

Table 2 identifies the number of parcels that would be offered by field office and county, acres of federal minerals (public domain or acquired lands) and summarizes development potential and estimated acres of surface disturbance based upon a sale specific Reasonably Foreseeable Development (RFD) scenario

(see **Appendix D**).

The terms and conditions of the standard federal lease and federal regulations would apply to the parcels offered for sale in the Proposed Action. Stipulations shown in **Appendix A** would be included with the identified parcel offered for sale. Standard operating procedures for oil and gas development include measures to protect the environment and resources such as groundwater, air, wildlife, cultural resource concerns, and others specified in the respective RMP for each planning area.

Lease stipulations would be attached to the parcels to address site specific concerns or new information not previously identified in the land use planning process. Once sold, the lease purchaser would have the right to use as much of the leased lands as is reasonably necessary to explore and drill for all the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (43 CFR § 3101.1-4).

Conditions of Approval (COAs) would be attached to permits issued to explore and develop the parcels to address site specific concerns or new information once an APD is analyzed in future NEPA documents.

Standard operating procedures, best management practices (BMPs), and COAs can change over time to meet RMP objectives, resource needs or land use compatibility.

A Federal oil and gas lease would be issued for a 10-year period and would remain valid for as long thereafter as oil or gas is produced in paying quantities, required payments are made and lease operations are conducted in compliance with regulations and approved permits. If a lessee fails to produce oil and gas by the end of the initial 10-year period, does not make annual rental payments, or does not comply with the terms and conditions of the lease, the BLM will terminate the lease. The lessee can relinquish the lease. The oil and gas resources could be offered for sale at a future lease sale.

Drilling of wells on a lease would not be permitted until the lessee or operator secures approval of a drilling permit and a surface use plan as specified in 43 CFR § 3162. This requires additional environmental reviews, by the BLM, at the time of application.

Upon cessation of lease operations, the BLM's regulations and the terms of the lease agreement require the lessee to plug the well(s) and abandon any facilities on the lease. The surface must be reclaimed to the satisfaction of the BLM authorized officer, in accordance with Onshore Oil and Gas Order No. 1.

Table 2. September 2023 Lease Sale: Parcels by County, Public Domain & Acquired Lands, Development Potential, and Estimated Surface Disturbance[1]

County	Alternative B				Development Potential	Estimated # of Wells	Estimate Acres of Surface Disturbance (short/long term)
	# Parcels	BLM Surface	Non-Federal Surface (Split Estate)	USFS Surface			
North Dakota Field Office							
McKenzie	32	0.00	0.00	10,735	3 - Moderate 11 – High 18 – Very High	12 oil	56.8 acres ST 26 acres LT
Total	**32**	**0.00**	**0.00**	**10,735**	3 – Moderate 11 – High 18 – Very High	12 oil	56.8 acres ST 26 acres LT
Grand Total	**32**	**10,735 Acres**					

[1]Total number of wells estimated based on the RFD and rounded to the nearest whole number

3 Affected Environment and Environmental Consequences

This chapter describes the affected environment (i.e., the physical, biological, and socioeconomic values and resources) and environmental consequences to resources that could be affected by implementation of the proposed action. This analysis is tiered to the respective RMP for each geographic location of the nominated parcels, and the analysis of the reasonably foreseeable effects of oil and gas development contained in those RMPs are incorporated by reference into this analysis.

Each RMP determined which areas are available for oil and gas leasing and under what conditions those leases would be offered and sold. All the lease parcels included in the proposed action are within areas that are open to oil and gas leasing in their respective RMP.

The act of leasing parcels would not cause direct effects to resources because no surface disturbance would occur. The only direct effects of leasing are the creation of valid existing rights and impacts related to revenue generated by the lease sale receipts.

Future lease exploration and development activities proposed through individual APD submission would be subject to future BLM decision-making and NEPA analysis. Upon receipt of an Application for a Permit to Drill (APD), the BLM would initiate a site-specific NEPA analysis that considers the reasonably foreseeable effects of a specific action. At that time, detailed information about proposed wells and facilities would be provided for specific leases. In all potential exploration and development scenarios, the BLM would require the use of BMPs documented in "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (USDOI 2007), also known as the *Gold Book*, available online at https://www.blm.gov/programs/energy-and-minerals/oil-and- gas/operations-and- production/the-gold-book. The BLM could also identify Conditions of Approval (COAs), based on site- specific analysis that could include moving the well location, restrict timing of the project, or require other reasonable measures to minimize adverse impacts (43 CFR § 3101.1-2 Surface use rights; Lease Form 3100-11, Section 6) to protect sensitive resources, and to ensure compliance with laws, regulations, and land use plans.

BLM resource specialists prepared this EA to document the analysis of the lease parcels and recommended appropriate stipulations based upon professional knowledge of the areas involved, review of current databases, scientific literature, and file information. The analysis focuses on the resource impact indicator(s) identified for each resource issue in Chapter 1.

At the time of this review, it is unknown whether a particular parcel will be sold, and a lease issued. It is also unknown when, where, or if future well sites, roads, and facilities might be proposed. Therefore, the types, magnitude and duration of potential impacts cannot be precisely quantified at this time and would vary according to many factors.

The BLM analyzed potential impacts from oil and gas development in the Final Environmental Impact Statement (FEIS) for each of the applicable ARMPs based upon potential well densities discerned from the Reasonably Foreseeable Development (RFD) Scenario developed for each Field Office. The BLM utilized information from the RFD in the ARMP to estimate the number of possible oil and gas wells that could be drilled and produced on parcels in the September 2023 sale. The sale specific RFD was used to analyze effects of the proposed action. Refer to **Appendix D** for a detailed description of the sale specific RFD.

3.1 General Setting

The analysis area varies by resource, and generally includes the 32 lease parcels of Federal minerals

for oil and gas leasing, covering approximately 10,735.41 Federal mineral acres in McKenzie County in North Dakota, as well as a larger area around the parcels to capture all reasonably foreseeable effects. The temporal scale of effects includes the 10-year period of a lease term, unless the lease is held by production, in which case the temporal scale is extended to the life of the producing well. If the lease parcels are developed, short-term impacts would be stabilized or mitigated rapidly (within two to five years). Long-term impacts are those that would substantially remain for more than five years.

Geologic Formations

Williston Basin

Parcels proposed in McKenzie County are located within the Williston Basin unconventional Bakken/Three Forks development area. The Williston Basin parcels are surrounded by horizontal Bakken/Three Forks development wells which have also been predominantly drilled in the past 10 years. The Bakken/Three Forks is a true unconventional reservoir where the wells target organic rich shale intervals.

3.2 Methodology and Assumptions

Analysis of issues brought forward in this assessment was completed using reasonably foreseeable development (RFD) scenarios created for the proposed lease parcels. RFD scenarios for the proposed lease parcels were developed using the Minerals Appendices from the RMPs for the respective field offices. The RMPs contain the number of potential oil and gas wells that could be drilled and produced in each field office area, and this was used to analyze the potential number of wells drilled for the nominated lease parcels. These well numbers are only an estimate based on historical drilling, geologic data, resource expertise, and current development in the area.

3.3 Issue 1 – Air Resources

3.3.1 Affected Environment

The Environmental Protection Agency (EPA) established primary and secondary National Ambient Air Quality Standards (NAAQS) for six principal air pollutants (or criteria air pollutants) which may be harmful to the public health and environment including: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} & $PM_{2.5}$), sulfur dioxide (SO_2) and lead (Pb) (EPA, 2023c). Primary standards set limits to protect public health, including the health of at-risk populations such as people with pre-existing heart or lung disease, children, and older adults. Secondary standards, on the other hand, set limits to protect public welfare, including visibility impairment and damage to animals, crops, vegetation, and buildings.

Determining compliance with the NAAQS can be evaluated using a variety of methods such as ambient air quality monitoring stations, air diffusion modeling, and/or photochemical grid modeling. Pollutant concentrations that are below the NAAQS are designated as attainment or unclassifiable, and air quality is generally considered to be good. Locations in which monitored pollutant concentrations are higher than the NAAQS are designated nonattainment, and air quality is considered unhealthy. For this proposed action in Montana and North Dakota, an approximate 50 km (31.1 miles) radius around the lease parcels were used to help assess regulatory compliance because the maximum distance recommended to predict compliance of the NAAQS using the preferred EPA AERMOD air diffusion modeling software is 50 km.

The EPA delegated authority, under the Clean Air Act (CAA), for individual states to complete various activities such as air quality permitting, compliance monitoring, and air quality monitoring. Similarly, Tribal governments have the authority to develop and implement air quality programs through the Tribal Authority Rule under the provisions of CAA. In North Dakota, the Department of Environmental Quality (ND DEQ) Division of Air Quality (DoAQ) is responsible for air quality permitting and compliance, oil or gas well registrations, and ambient air quality monitoring under the CAA (ND DoAQ, 2023). Both North Dakota and Montana have developed a network of ambient air quality monitoring sites to assess NAAQS compliance and **Table 3** provides air pollutant concentrations within the proposed lease areas using design values. The design value is the annual arithmetic mean concentrations, averaged over 3 years, and describes the air quality status of a given location relative to the NAAQS. Design values are used to designate and classify nonattainment areas, as well as to assess progress towards meeting the NAAQS. Counties without monitoring stations have an unclassifiable attainment status and are assumed to have good air quality with pollutant concentrations below the NAAQS. For North Dakota, all lease parcels are in areas that are designated attainment or unclassifiable for each NAAQS.

Table 3. Criteria Pollutant Design Values-2019-2021

Pollutant	Monitor Location/County	Averaging Time	Design Value Concentration [(1)]	NAAQS	% NAAQS
$PM_{2.5}$ ($\mu g/m^3$)	Waterford City, ND (McKenzie)	Annual	4.8	12	40%
$PM_{2.5}$ ($\mu g/m^3$)	Painted Canyon, ND (Billings)	Annual	4.2	12	35%
$PM_{2.5}$ ($\mu g/m^3$)	Waterford City, ND (McKenzie)	24-hour	20	35	57%
$PM_{2.5}$ ($\mu g/m^3$)	Painted Canyon, ND (Billings)	24-hour	16	35	46%
O_3 (ppm)	Waterford City, ND (McKenzie)	8-hour	0.058	0.070	83%
O_3 (ppm)	Painted Canyon, ND (Billings)	8-hour	0.060	0.070	86%
NO_2 (ppb)	Waterford City, ND (McKenzie)	Annual	1	53	2%
NO_2 (ppb)	Waterford City, ND (McKenzie)	1-hour	10	100	10%
SO_2 (ppb)	Waterford City, ND (McKenzie)	1-hour	5	75	7%
SO_2 (ppb)	Painted Canyon, ND (Billings)	1-hour	5	75	7%

Source: EPA Design Values Air Quality Design Values | US EPA
(1) Dataset includes all values (including flagged exceptional events).

Oil and gas development activities may impact ambient air concentrations of PM_{10}, $PM_{2.5}$, O_3, CO, NO_x, VOC, H_2S, and SO_2. Particulate matter comes from a variety of sources such as construction activities, unpaved roads, cars, trucks, or other operations that burn fossil fuels while O_3 is not emitted directly into the air but created from pollutants such as NO_x and VOC that chemically react in the presence of sunlight. In addition, other particles may form in the atmosphere as a result of complex reactions from SO_2 and NO_x. In addition to oil and gas operations, pollutants SO_2 and NO_x are also emitted from power plants and automobiles whereas the most significant sources of CO are mostly from cars, trucks, or machinery that burn fossil fuels. On the other hand, SO_2 emissions from oil and gas facilities may also be created from the combustion (e.g., flaring) of gas containing H_2S, and although no Federal NAAQS exists for H_2S, North Dakota have ambient air quality standards for H_2S. North Dakota's H_2S standard was developed in response to elevated sulfur content during petroleum

production in the 1980s; however, emissions of H_2S have reduced over time as production from the older facilities declined. The Bakken Formation, which has been the focus of the most recent oil and gas activity in Montana and North Dakota, generally has low concentrations (if any) of H_2S compared to non-Bakken Formations. For North Dakota, the owner or operator of any oil or gas well production facility must install or maintain pollution controls necessary to ensure that emissions comply with the ambient air quality standards.

EPA also regulates emissions of hazardous air pollutants (HAPs) that are suspected to cause cancer or other serious health effects. EPA's current HAP list includes 188 air toxics, and under the CAA, EPA is required to develop regulations to control emissions for all industries that emit one or more listed HAPs in substantial quantities (EPA, 2023b). Since 1990, EPA has issued regulations limiting emissions of air toxics from more than 174 categories of major industrial sources including crude oil and natural gas production sources. Because HAPs are released from oil and gas operations (including from well drilling, well completion, and operation), the EPA established technology-based emission standards to help control HAP emissions. HAPs associated with the oil and gas industry may include compounds such as formaldehyde, benzene, toluene, ethyl benzene, xylene, and normal-hexane (n-hexane). Originally published in 2016, New Source Performance Standards (NSPS) 40 CFR Part 60 Subpart OOOOa (Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015) created emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO_2) emissions from affected facilities. In addition, the EPA developed a National Toxics Assessment Tool to evaluate impacts from existing HAP emissions across the nation. Using the EPA National Toxics Assessment Tool, the total cancer risk for North Dakota, was below the upper limit of acceptable lifetime risk of 100 in 1 million people to develop cancer, as described in 40 CFR § 300.430. In addition, the noncancer hazard index for North Dakota is below 1.0, indicating that air toxics will not likely cause adverse noncancer health effects.

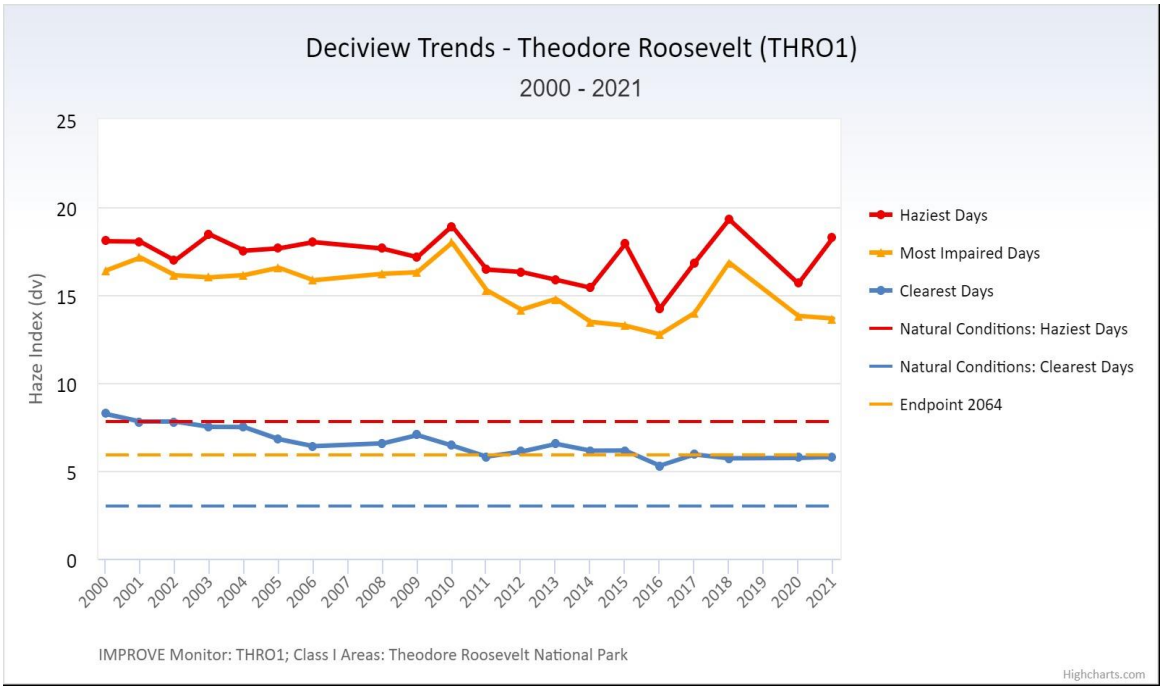
In addition to NSPS, the EPA Prevention of Significant Deterioration (PSD) program was designed to protect human health and environment by demonstrating that new emissions will not cause or contribute to a violation of any applicable NAAQS or PSD increments. A PSD increment is the amount of pollution an area is allowed to increase to prevent air quality from deteriorating that would cause a violation of the NAAQS. The parcels in this lease sale are located within or near PSD Class I and II areas. Most areas throughout the United States are categorized as Class II which allow for some air quality deterioration under PSD. However, for Class I areas, PSD provides additional stringent air quality and visibility protection to national parks and national wilderness areas. Class I areas located near the lease sale areas include the Peck Theodore Roosevelt National Parks (North and South) and Fort Berthold Reservation.

The Federal Land Manager (FLM) is responsible for defining Air Quality Related Values (AQRVs), including visual air quality (haze) and atmospheric deposition for an area, and establishing criteria to determine an adverse impact on the AQRVs. AQRVs are not threshold standards, but a FLM may identify levels of concern and provide recommendations to the permitting authority. Atmospheric visibility is a measure of how far and how well an observer can see a distant and varied scene. The visual range is the greatest distance in miles that a person can see a large dark object viewed against the horizon sky. Light extinction or attenuation is a nonlinear measure of visibility and occurs in the atmosphere as a result of scattering and absorption. Pollutants from natural and anthropogenic sources contribute to haze by scattering and absorbing light. A deciview (dv) is a unit of measurement used to quantify human perception of visibility and is calculated from the natural logarithm of atmospheric light extinction. One (1) deciview is roughly the smallest change in visibility (haze) that is barely perceptible. Because visibility at any one location is highly variable seasonally throughout the year, visibility is characterized by three groupings: 1.) clearest 20% days, 2.) average 20% days, and 3.)

haziest 20% days. Average visual range is 60 to 90 miles (100 to 150 kilometers) in many Class I areas in the western United States, equivalent to 9.6 to 13.6 deciview (dv), or about 50 to 70 percent of the visual range that would exist without anthropogenic air pollution from stationary and mobile sources (64 Fed. Reg. 35714).

The Interagency Monitoring of Protected Visual Environments (IMPROVE) Program collects and identifies visibility and composition trends throughout the nation. The IMPROVE monitoring site located at Class I areas near the proposed lease sale parcels is Theodore Roosevelt National Park (TRNP) (Federal Land Manager Environmental Database, 2023). **Figure 1** provide a graphical representation of annual visibility trends for the period ranging from 2000 to 2021. Based on the data, visibility trends have not changed significantly over the monitoring period; however, it does appear to reveal an improving trend for the clearest and most impaired days at the monitoring sites.

Figure 1. Theodore Roosevelt (THRO1) - Visibility Trends at Theodore Roosevelt National Park, North Dakota

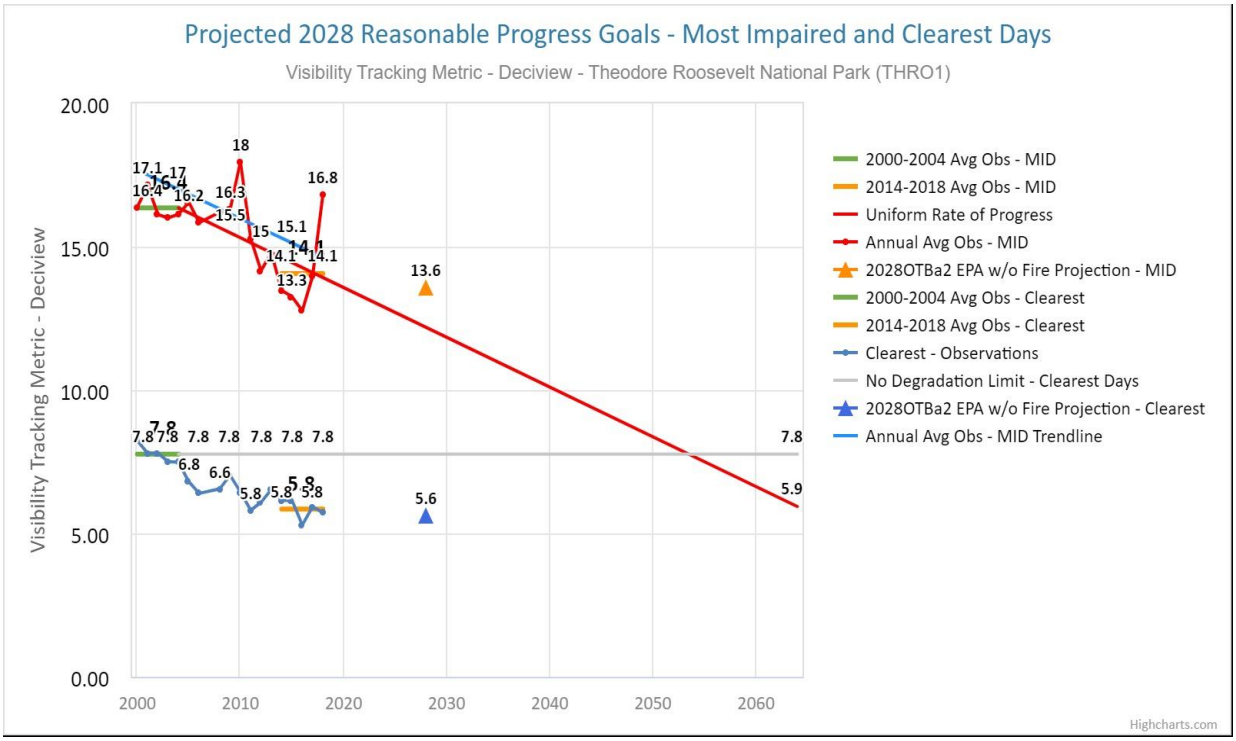


Source: Federal Land Manager Environmental Database, 2023

In addition to IMPROVE, the Western Regional Air Partnership (WRAP) Technical Support System (TSS) is an online portal that provides advanced data acquisition and analytical tools for the development of State and Tribal Implementation Plans to help track progress and improve visibility in Class I areas related to EPA's Regional Haze Rule ((TSS Home (colostate.edu)). The TSS summarizes results and consolidates information about air quality monitoring; meteorological and receptor modeling data analyses; emissions inventories and models; and gridded air quality/visibility regional modeling simulations. The projected 2028 reasonable progress goal for the most impaired and clearest days for Theodore Roosevelt National Park (THRO1) (**Figure 2)** is provided. **Figure 2** illustrates the Uniform Rate of Progress (URP) Glidepath as defined by EPA guidance, compared to IMPROVE measurements for the period 2000-2018. The URP glidepath is constructed for the 20% most impaired days (MID) or clearest days using observations from the IMPROVE monitoring site. The URP glidepath starts with the IMPROVE MID for the 2000-2004 5-year baseline and draws a straight line to estimated natural conditions in 2064. For clearest days, the goal is no degradation of

visibility from the 2000-2004 5-year baseline, therefore glidepath for clearest days is a straight line from the 2000-2004 baseline to 2064. In the second regional haze planning period, 2064 natural conditions estimates are the same as the 15-year average of natural conditions on most impaired days or clearest days in each year 2000-2014. IMPROVE annual average values are presented as points and 5-year average values are presented as solid lines covering the periods 2000-2004 and 2014-2018.

Figure 2. Projected Reasonable Progress Goals-Theodore Roosevelt National Park (THRO1), North Dakota



Unlike visibility, atmospheric deposition occurs when gaseous and particulate air pollutants are deposited on the ground, water bodies, or vegetation. The pollutants may be deposited as dust or transported from the atmosphere in the form of rain, fog, or snow. When air pollutants such as sulfur and nitrogen are deposited into ecosystems, acidification or enrichment of soils and surface waters may occur. Atmospheric nitrogen and sulfur deposition may affect water chemistry, resulting in impacts to aquatic vegetation, invertebrate communities, amphibians, and fish. Deposition can also cause chemical changes in soils that alter soil microorganisms, plants, and trees. Although nitrogen is an essential plant nutrient, excess nitrogen from atmospheric deposition can stress ecosystems by favoring some plant species and inhibiting the growth of others. Information on wet and dry deposition at Class I areas within the analysis area can be found at EPA's Clean Air Status and Trends Network monitoring program at Clean Air Status and Trends Network (CASTNET) | US EPA.

In addition to oil and gas emissions sources, air quality and AQRVs are influenced by industrial sources, motor vehicles, agricultural practices, long-range emissions transport, and natural sources such as wildfire smoke. Oil and gas processing and refining facilities are permitted by local, state, tribal, and/or federal agencies and report pollutant air emissions annually to the EPA. Each proposed new and modified facility is required to demonstrate compliance with NAAQS. The compliance requirements and air monitoring network throughout North Dakota ensure that an area remains in compliance with the NAAQS. The criteria pollutant emissions from oil and gas operations, including

from lease sales, can be found in the EPA's National Emission Inventory. In addition, projections of regional air quality resulting from oil and gas development on BLM lands is documented in several BLM reports such as the 2015 Miles City Field Office (MCFO) Air Resource Management Plan (BLM, 2015), 2016 Montana/Dakotas State Office Photochemical Grid Modeling (PGM) Modeling Study Air Resources Impact Assessment–Final Report (BLM, 2016), and North Dakota Field Office Draft Resource Management Plan (RMP) and Environmental Impact Statement (EIS) (BLM, 2023). The 2015 and 2023 MCFO Air Resource Management Plans evaluated near field impacts to air quality from oil and gas development as well as projections of visibility within the region, and the PGM study assessed regional impacts to air quality from future oil and gas development on BLM administered mineral estate in Montana, North Dakota, and South Dakota. The 2015 MCFO RMP conducted a near-field assessment of impacts on ambient air quality to evaluate maximum pollutant impacts within the MCFO planning area resulting from oil and gas activities. Air pollutant dispersion modeling was performed to quantify maximum potential criteria pollutant (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$) and HAP (benzene, toluene, ethyl benzene, xylenes, n-hexane, and formaldehyde) impacts from development and production. AERMOD was used to model the maximum potential emissions of CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ and HAPs that could occur from well pad/road construction, drilling/completion, and production sources. When maximum modeled concentrations of criteria pollutant (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$) impacts from the modeled scenarios were added to representative background concentrations, it was demonstrated that the total ambient air concentrations were less than the applicable NAAQS. In addition, direct modeled concentrations resulting from production activities were below the applicable PSD Class II increments for production activities. Maximum modeled HAP impacts (benzene, toluene, ethyl benzene, xylenes, n-hexane, and formaldehyde) were shown to be well below applicable RELs and RFCs. In addition, incremental cancer risks were well below a one-in-one million risk for suspected or known carcinogens benzene, ethyl benzene and formaldehyde.

The results of the PGM study are applicable to this EA because the development potential for the proposed lease sale was included within the reasonably foreseeable development (RFD) scenarios analyzed in the PGM study. The modeling (i.e., emissions and impact) scenarios did not produce emissions more than the NAAQS or state ambient air quality standards for O_3, $PM_{2.5}$, PM_{10}, SO_2, NO_2 or CO. Therefore, impacts to air quality and public health are expected to be minimal in future years at the predicted rate of oil and gas development across the region. However, the modeling study predicted impacts to visibility at Class I areas in eastern Montana and western North Dakota in which a portion of the predicted impacts can be attributed to future federal oil and gas development (more than 0.5 and 1.0 dv thresholds) at the Theodore Roosevelt, Fort Peck, and Medicine Lake Class I areas. The PGM modeling study also predicted the potential for minor impacts attributed to atmospheric deposition of nitrogen compounds in the same region. Nonetheless, as mentioned previously, monitoring data have shown an overall improving trend in visibility at Class I areas in Montana and North Dakota. According to the National Park Service air quality data collection and analysis efforts (Air Quality in Parks - Air (U.S. National Park Service) (nps.gov)), the overall air quality at Theodore Roosevelt National Park is classified as "fair" with a varied trend. Air quality conditions for visibility (10.1 dv) and O_3 (57.8 ppb) were described as "fair" with unchanging trends while conditions related to nitrogen deposition was also "fair" (2.6 kilograms per hectare per year (kg/ha/yr)) with a degrading trend. However, sulfur deposition for the area was described as "good" (0.7 kg/ha/yr) with a relatively unchanging trend.

In addition to the 2016 PGM modeling study, the 2023 North Dakota Draft RMP and EIS reported modeled air quality contributions of new federal oil and gas development (i.e., 2020 onward) in North Dakota including ambient air concentrations of selected criteria pollutants and AQRV contributions for acidic deposition, visibility change, and the ozone W126 index. Peak modeled cumulative values, percent contribution of new federal oil and gas development and time period of the peak value, and the

peak contribution were discussed. According to the 2023 North Dakota Draft RMP and EIS, for the modeled activity levels, new federal oil and gas wells were expected to contribute between approximately 0.0 percent and 11 percent by pollutant to the maximum cumulative value across North Dakota. The largest fraction would be for hourly NO_2 in the Williston Basin caused primarily by NO_x emissions from drill rigs and off-road equipment. Class I areas would experience some air quality impact from federal oil and gas development with the highest impacts observed at the Fort Berthold Indian Reservation. Predicted concentrations for all modeled contaminants were below the NAAQS and NDAAQS; however, the peak cumulative modeled concentrations of 1-hour NO_2 and 24-hour PM_{10} were close to the NAAQS and potential impact issues would be addressed through appropriate lease notices and stipulations and potentially requiring near-field air modeling for proposed drilling projects. Furthermore, modeled acute and chronic noncarcinogenic HAPs were below the Reference Exposure Levels the estimated incremental cancer risks were also below a one per one million for the carcinogenic HAPs benzene and formaldehyde.

3.3.2 Environmental Effects —No Action Alternative A

Under the No Action Alternative, there would be no impact on air resources and greenhouse gas emissions compared to the proposed action. If the parcels are not available to be leased and potential development on the proposed parcels would not occur, then no increase in estimated emissions would be expected from potential oil and gas development. The No Action Alternative would result in the continuation of already-approved land uses and would not result in new impacts related to exploration of the proposed oil and gas lease parcels.

3.3.3 Environmental Effects—Proposed Action Alternative B

As previously described, the effects from oil and gas development on air resources in North Dakota have been analyzed and described in numerous documents such as the 2015 Miles City RMP (BLM, 2015), Montana/Dakotas (BLM-MT/DK) State Office Photochemical Grid Model (PGM) Modeling Study (BLM, 2016), and North Dakota Field Office Draft Resource Management Plan (RMP) and Environmental Impact Statement (EIS) (BLM, 2023).

Potential effects to air quality from the sale of lease parcels would only occur when the issued leases are developed and does not authorize or guarantee the number of wells described and analyzed in the EA. The drilling of wells on a lease parcel would not be permitted until the BLM approved an Application for Permit to Drill (APD). Any APDs received would be subject to site specific NEPA review; however, the EA would help inform the decision of the APD. In addition, there is a degree of uncertainty in estimating the amount of potential air emissions (including GHGs) for the EA. The oil properties, site geology, drilling and completion methodology, on-site equipment, project acreage, and construction plans are among several variables required to generate emissions estimates. Thus, the BLM may conduct additional air quality analysis during the APD process.

The analysis of air resources in this EA includes a discussion of short-term and long-term impact to air quality from potential oil and gas development on the lease parcels. Short-term impacts would occur from the construction of the well, well pad, access roads, pipelines, and other single occurrence activities. For example, motor vehicles would emit various pollutants such as CO, NO_x, HCs, and PM as well as increase fugitive dust through increase vehicle traffic and increase wind erosion in areas of soil disturbance. Drill rig and fracturing operation would result in an increase in NO_2, CO, HAP, VOC, and SO_2 emissions. Flaring or venting maybe necessary during drilling and well completion that would also result in increased emissions of NO_2, CO, VOC, and SO_2; however, it would be conducted in compliance with federal and state regulations. Similarly, throughout the long-term operation of the

facility, NO_2, CO, VOC, and HAP emissions would result from various equipment such storage tanks, pumps, separators, flares, and other equipment as well as road dust (PM) produced by vehicles servicing the facilities.

Potential emissions of PM_{10}, $PM_{2.5}$, NO_x, SO_2, CO, VOC, and HAPs are provided in **Table 4** and **Table 5**. The construction and production emissions are listed separately in the emission tables. The construction process is short-term and would be completed within a few months with intermittent emissions and production and maintenance emissions occur throughout the life of the well. Calculations are based on typical development and production scenarios. The calculations for pollutant emissions use the number of wells that may be developed within 10 years if the parcels were leased. EPA Tier 4 engine emission factors are used based on previous air emissions modeling using AERMOD indicating potential exceedance of the 1-hour NO_2 NAAQS, but non-Tier 4 engines could be used if current NO_x to NO_2 conversion factors and modeling demonstrate compliance with the NO_2 NAAQS.

Table 4. Estimated Air Pollutant Emissions from Well Development and Production

Activity	# of Wells[1]		PM_{10}		$PM_{2.5}$		NOx		SO_2	
	Oil	Gas	Emission Factor [2] (tons/well)	Estimated Emissions (tons)	Emission Factor [2] (tons/well)	Estimated Emissions (tons)	Emission Factor [2] (tons/well)	Estimated Emissions (tons)	Emission Factor [2] (tons/well)	Estimated Emissions (tons)
North Dakota Field Office[3]										
Construction (short-term)	12	0	0.51	6.12	0.06	0.72	0.53	6.36	0.11	1.32
Operations (long-term)	12	0	0.08	0.96	0.03	0.36	0.36	4.32	0.0005	0.006
Total Estimated Emissions:				**7.08**		**1.08**		**10.68**		**1.33**

1. Well numbers based on RFD for this lease sale.
2. Emission factors used in estimated emission calculations developed for 2015 MCFO RMP.
3. Emission factors are consistent across all counties and presented by Field Office

Table 5. Estimated Air Pollutant Emissions from Well Development and Production

Activity	# of wells [1]		CO		VOC		HAPs	
	Oil	Gas	Emission Factor[2] (tons/well)	Estimated Emissions (tons)	Emission Factor[2] (tons/well)	Estimated Emissions (tons)	Emission Factor[2] (tons/well)	Estimated Emissions (tons)
North Dakota Field Office[3]								
Construction (short-term)	12	0	2.76	33.12	0.36	4.32	0.03	0.36
Operations (long-term)	12	0	1.00	12	0.95	11.40	0.08	0.96
Total Estimated Emissions:				**45.12**		**15.72**		**1.32**

1. Well numbers based on RFD for this lease sale.
2. Emission factors used in estimated emission calculations developed for 2015 MCFO RMP.
3. Emission factors are consistent across all counties and presented by Field Office.

3.3.4 Reasonably Foreseeable Actions

The Montana/Dakotas PGM modeling study analyzed potential impacts from all reasonably foreseeable oil and gas development within the region over a 20-year period. These leases are not expected to occur contemporaneously and are not located next to each other. The lease sale would represent only a small fraction of the potential development that was included in the Montana/Dakotas PGM modeling study and would be expected to have little to no impact on air quality, visibility, or atmospheric deposition. Additional detailed information on estimated air pollutant emissions can be found in the Air Resource Technical Support Document (ARTSD) for Emission Inventories, Near-Field Modeling, and Visibility Screening, October 2014.

Emissions from oil and gas development have the potential to impact visibility in Class I areas. The 2015 MCFO RMP assessed visibility impacts from the exhaust from drill rig engines on Class I areas located approximately 1 km away. Predicted impacts on color difference and contrast were less than thresholds used to identify impacts. The 2015 MCFO RMP further analyzed far-field visibility impacts on Class I areas using the CALPUFF dispersion model. The CALPUFF model predicted visibility impacts are estimated to be below 0.5 change in deciviews (Δdv) at each Class I and Class II area analyzed. This threshold is included in guidance developed by the National Park Service, US Forest Service, and the FWS (FLAG 2010). At each receptor and for each year, zero days are predicted to occur when the 98th percentile change in deciviews would equal or exceed 0.5. Predicted impacts were 9-26 percent of the 0.5 threshold, much below the requirement for further analysis. Based on the results of the 2015 MCFO RMP modeling, oil and gas development is not considered to directly contribute to regional haze or result in visibility impairment. At the APD stage when site specific information is known, such as well pad location and construction equipment specifications, impacts can be further analyzed and mitigated, if necessary.

3.3.5 Mitigation of Impacts

3.3.5.1 BLM Best Management Practices (BMPs)

The BLM encourages industry to incorporate and implement BMPs to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. In addition, Lease Notice LN 14-18 would be applied to all parcels included in this proposed lease sale for conservation of air resources. The lease notice states, "*The lessee/operator is given notice that prior to project-specific approval, additional air resource analyses may be required in order to comply with the NEPA, FLPMA, and/or other applicable laws and regulations. Analyses may include equipment and operations information, emission inventory development, dispersion modeling or photochemical grid modeling for air quality and/or air quality related value impact analysis, and/or emission control determinations. These analyses may result in the imposition of additional project-specific control measures to protect air resources."*

If additional analysis reveals air quality impacts, additional control measures may include:

- Use of a Tier 4 non-road diesel engine that meets EPA NO_x emission standards or equivalent for each diesel-fueled non-road engine with greater than 200 horsepower design rating to be used during drilling or completion activities;
- Reduction in fugitive dust from roads and construction areas by using water, dust suppressants, surfacing, and other means;
- Develop strategies to minimize or eliminate venting using the most efficient means possible, using low or no bleed pneumatics, and promoting instrument air driven equipment, or

equipment that is actuated by other means;

- Use of intelligent design and siting of dehydrators so that the number of distributed dehydrators can be reduced, and larger more efficient dehydrators can be used and promote designs that consider cost effective controls for dehydrator vents; and
- Capture for beneficial use or destruction of separated gas from the oil/condensate/produced water streams.

Similarly, one or more of the following measures could be imposed at the development/APD stage if additional analysis showed the potential for significant impacts to air quality:

- Emission control equipment with minimum 95 percent volatile organic compound (VOC) control efficiency;
- Low-emitting drill rig engines, such as Tier 4 diesel engines or natural gas or electric drill rig engines;
- Gas or electric turbines for compression rather than internal combustion engines;
- Replacement of older internal combustion engines with low-emitting engines that meet EPA New Source Performance Standards;
- Water or chemical suppressant application and reduced speed limits to control fugitive dust emissions;
- Multi-well pads to reduce surface disturbance and traffic;
- Replacement of diesel-fired pump jack engines with electrified engines;
- Reinjection of waste gas into no-producing wells or other underground formations;
- Infrared (FLIR) technology to detect fugitive VOC and methane emissions and repair leaking equipment quickly; and
- Additional technologies for reducing methane emissions as recommended by EPA's natural gas STAR program.

3.4 Issue 2 – Greenhouse Gases

Future development of the lease parcels under consideration could lead to emissions of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), the three most common greenhouse gases associated with oil and gas development. These GHG emissions would be emitted from leased parcels if developed, and from the consumption of any fluid minerals that may be produced. However, the BLM cannot reasonably determine at the leasing stage whether, when, and in what manner a lease would be explored or developed. The uncertainty that exists at the time the BLM offers a lease for sale includes crucial factors that would affect actual GHG emissions and associated impacts, including but not limited to the future feasibility of developing the lease, well density, geological conditions, development type (vertical, directional, or horizontal), hydrocarbon characteristics, specific equipment used during construction, drilling, production, abandonment operations, production and transportation, and potential regulatory changes over the 10-year primary lease term. Actual development on a lease may vary from what is analyzed in this EA and may be evaluated through site-specific NEPA analysis when an operator submits an APD or plan of development to the BLM.

For the purposes of this analysis, the BLM has evaluated the potential effects of the proposed leasing action on climate change by estimating and analyzing potential GHG emissions from projected oil and gas development on the parcels proposed for leasing using estimates based on past oil and gas development and available information from existing development within the State.

Further discussion of climate change science and predicted impacts, as well as the reasonably foreseeable and cumulative GHG emissions associated with BLM's oil and gas leasing actions, are included in the *BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (BLM, 2022) (hereinafter referred to as the Annual GHG Report). This report presents the estimated emissions of greenhouse gases attributable to development and consumption of fossil fuels produced on lands and mineral estate managed by the BLM. The Annual GHG Report is incorporated by reference as an integral part of this analysis and is available at https://www.blm.gov/content/ghg/2021.

3.4.1 Affected Environment

Climate change is a global process that is affected by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from a single proposed land management action cannot be accurately translated into its potential effect on global climate change or any localized effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources as a result of specific emissions. However, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to climate change resulting from the accumulation of GHG emissions over time. GHGs influence the global climate by increasing the amount of solar energy retained by land, water bodies, and the atmosphere. GHGs can have long atmospheric lifetimes, which allows them to become well mixed and uniformly distributed over the entirety of the Earth's surface no matter their point of origin. Therefore, potential emissions resulting from the proposed action can be compared to state, national, and global GHG emission totals to provide context of their significance and potential contribution to climate change impacts.

Table 6 shows the total estimated GHG emissions from fossil fuels at the global, national, and state scales over the last five years. Emissions are shown in megatonnes (Mt) per year of carbon dioxide equivalent (CO_2e). Chapter 3 of the Annual GHG Report contains additional information on GHGs and an explanation of CO_2e.

Table 7 shows the calculated GHG emissions (in megatonnes of CO2e) for all federal fossil fuels (includes offshore oil and gas production) based on 2020 production data obtained from the Department of the Interior's Office of Natural Resources Revenue (ONRR), as well as the percent contribution from federal fossil fuels to total U.S. fossil fuel GHG emissions.

Table 8 shows GHG emissions data from the largest greenhouse gas emitting facilities as reported to the U.S. Environmental Protection Agency (EPA) through its Greenhouse Gas Reporting Program (GHGRP) for those states associated with this potential leasing action**.**

Table 8 also shows energy-related CO_2 emissions reported by the U.S. Energy Information Administration (EIA) in its annual State Energy-Related Carbon Dioxide Emissions Tables (EIA, 2022b). State energy-related CO_2 emissions include emissions from fossil fuel use across all sectors (residential, commercial, industrial, transportation, and electricity generation) and are released at the location where the fossil fuels are consumed. State and national energy-related CO_2 emissions include emissions from fossil fuel use across all sectors (residential, commercial, industrial, transportation, and electricity generation) and are released at the location where the fossil fuels are consumed. Additional information on current state, national, and global GHG emissions as well as the methodology and parameters for estimating emissions from BLM fossil fuel authorizations and cumulative GHG emissions is included in the Annual GHG Report (See Chapters 4, 5, and 6.).

Table 6. Global, U.S., North Dakota, and Montana GHG Emissions 2016 - 2020 (Mt CO2/yr)

Scale	2016	2017	2018	2019	2020
Global	36,465.6	36,935.6	37,716.2	37,911.4	35,962.9
U.S.	5,077.0	5,005.5	5,159.3	5,036.0	4,535.3
North Dakota	80.3	82.8	92	96.5	82.2
Montana	55.7	55.5	56.1	57.9	55.7
Source: Annual GHG Report, Chap. 6, Table 6-1 (Global and U.S.) and Table 6-3 (State). Source: State GHG Emissions and Removals | U.S. EPA. Mt (megatonne) = 1 million metric tons NA = Not Available					

Table 7. 2020 Federal Fossil Fuel GHG Emissions and Percent Federal Contribution (Mt CO2e/yr)

Resource	U.S. Total	Federal Total [1]	% Contribution of Federal Emissions
Coal	1,248.1	490.9	39.34
Oil	2,363.2	516.4	21.86
Gas	2,726.4	316.2	11.61
Total	6,337.7	1,324.3	20.9
[1] Federal Total includes emission estimates for both on-shore and off-shore oil and gas production for 2020 based on ONRR production data found in https://revenuedata.doi.gov/downloads/production/			

Table 8. State GHG Emissions

State	EPA - GHGRP Large Emitters (Mt CO_2/yr)			EIA Energy-related CO_2 Emissions (Mt/yr)
	Total Reported	Power Plants	Petroleum and Natural Gas Systems	
Montana	20.9	16.4	0.9	30.7
North Dakota	37.8	28.2	2.4	59.2
South Dakota	6.4	3.3	0	15.6
Sources: Annual GHG Report, Chap. 6, Table 6-3; Energy Information Administration				

The continued increase of anthropogenic GHG emissions over the past 60 years has contributed to global climate change impacts. A discussion of past, current, and projected future climate change impacts is described in Chapters 8 and 9 of the Annual GHG Report. These chapters describe currently observed climate impacts globally, nationally, and in each State, and present a range of projected impact scenarios depending on future GHG emission levels. These chapters are incorporated by reference in this analysis.

3.4.2 Environmental Effects—No Action Alternative

Under the No Action Alternative, the BLM would not offer any of the nominated parcels in this lease sale. However, in the absence of a Land Use Plan Amendment closing the lands to leasing, they could be considered for inclusion in future lease sales. Although no new GHG emissions associated with new Federal oil and gas development for the subject leases would occur under the No Action Alternative in the foreseeable future, the cumulative demand for energy is not expected to differ regardless of BLM decision-making (EIA 2020). The BLM does not have information regarding the energy source that could fill the energy demand if development does not occur on the subject leases. Although the change in emissions compared to the Proposed Action could range from a 98.5% decrease if hydroelectricity is substituted to a 210% increase if coal is substituted, see Table 10-3 in Section 10.0 of the Annual Report (BLM 2022).

Over the past decade the increasing use of natural gas has replaced energy produce from coal which contributed to lower emissions. In 2022, high prices for natural gas and demand exceeding supply have resulted in some countries reactivating or delaying planned closures of coal fired power plants (Reuters 2022). In the future, renewable energy is anticipated to become a larger part of the U.S. energy mix and reducing energy related carbon emissions. It has been estimated that with a 35% integration of wind and solar energy into the Western United States electric grid, there would be an additional 25-45% reduction in carbon emissions (BLM 2022). Based on this information there is potential for higher emissions over the short-term and reduced emissions over the long-term. The BLM cannot estimate the net effects across all energy markets to understand the mix of energy resources that will meet demand and therefore can't provide an estimate of SC-GHG for the No Action Alternative.

3.4.3 Environmental Effects— Proposed Action Alternative

While the leasing action does not directly result in development that will generate GHG emissions, emissions from potential future development of the leased parcels are reasonably foreseeable and can be estimated for the purposes of this lease sale. There are four general phases of post-lease development that would generate GHG emissions: 1) well development (well site construction, well drilling, and well completion), 2) well production operations (extraction, separation, gathering), 3) mid-stream (refining, processing, storage, and transport/distribution), and 3) end-use (combustion or other uses) of the fuels produced. While well development and production operation emissions occur on-lease and the BLM has program authority over these activities, mid-stream and end-use emissions typically occur off-lease where the BLM has no program authority.

Emissions inventories at the leasing stage are imprecise due to uncertainties including the type of mineral development (oil, gas, or both), scale, and duration of potential development, types of equipment (drill rig engine tier rating, horsepower, fuel type), and the mitigation measures that a future operator may propose in their development plan. In order to estimate reasonably foreseeable on-lease emissions at the leasing stage, the BLM uses estimated well numbers based on State data for past lease development combined with per-well drilling, development, and operating emissions data from representative wells in the area. The amount of oil or gas that may be produced if the offered parcels are developed is unknown. For purposes of estimating production and end-use emissions, potential wells are assumed to produce oil and gas in similar amounts as existing nearby wells. While the BLM has no authority to direct or regulate the end-use of the products, for this analysis, the BLM assumes all produced oil or gas will be combusted (such as for domestic heating or energy production). The BLM acknowledges that there may be additional sources of GHG emissions along the distribution, storage, and processing chains (commonly referred to as midstream operations) associated with production from the lease parcels. These sources may include emissions of methane (a more potent GHG than CO_2 in the short term) from

pipeline and equipment leaks, storage, and maintenance activities. These sources of emissions are highly speculative at the leasing stage; therefore, the BLM has chosen to assume that mid-stream emissions associated with lease parcels for this analysis will be similar to the national level emissions identified by the Department of Energy's National Energy Technology Laboratory (NETL, 2009) (NETL, 2019).

The emission estimates calculated for this analysis were generated using the assumptions previously described above using the BLM Lease Sale Emissions Tool. Emissions are presented for each of the four phases of post-lease development described above.

- Well development emissions occur over a short period and may include emissions from heavy equipment and vehicle exhaust, drill rig engines, completion equipment, pipe venting, and well treatments such as hydraulic fracturing.

- Well production operations, mid-stream, and end-use emissions occur over the entire production life of a well, which is assumed to be 30 years for this analysis based on the productive life of a typical oil/gas field.

- Production emissions may result from storage tank breathing and flashing, truck loading, pump engines, heaters and dehydrators, pneumatic instruments or controls, flaring, fugitives, and vehicle exhaust.

- Mid-stream emissions occur from the transport, refining, processing, storage, transmission, and distribution of produced oil and gas. Mid-stream emissions are estimated by multiplying the estimated ultimate recovery (EUR) of produced oil and gas with emissions factors from NETL life cycle analysis of U.S. oil and natural gas. Additional information on emission factors can be found in the Annual GHG report (Chapter 4, Table 4-7 and 4-9).

- For the purposes of this analysis, end-use emissions are calculated assuming all produced oil and gas is combusted for energy use. End-use emissions are estimated by multiplying the EUR of produced oil and gas with emissions factors for combustion established by the EPA (Tables C-1 and C-2 to Subpart C of 40 CFR § 98). Additional information on emission factors and EUR factors can be found in the Annual GHG Report (Chapter 4).

Table 9 provides the estimated direct (well development and production operations) and indirect (mid-stream and end-use) GHG emissions in metric tons (tonnes) for the subject leases over the average 30-year production life of the lease.
Table 10 provides maximum year and average year emissions over the life of the lease.

Table 9. Estimated Life of Lease Emissions from Well Development, Well Production Operations, Mid-stream, and End-use (tonnes)

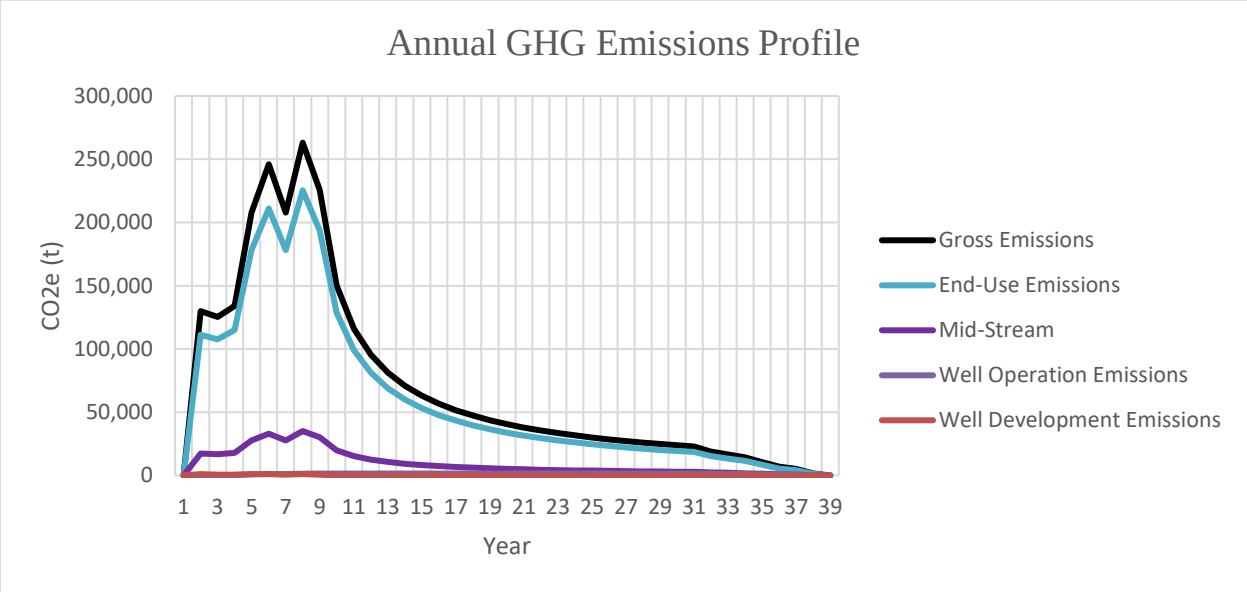
Activity	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2e (20-yr)
Well Development	6,622	3.14	0.078	6,737	6,903
Well Production Operations	39,430	249.22	0.337	46,949	60,083
Mid-Stream	320,331	1,395.77	5.194	363,343	436,900
End-Use	2,329,877	85.03	16.235	2,336,843	2,341,324
Total	2,696,260	1,733.16	21.844	2,753,871	2,845,209
Source: BLM Lease Sale Emissions Tool					

Table 10. Estimated Maximum Year and Average Year Emissions from the Lease Parcels on an Annual and Life of Lease basis (tonnes)

	CO_2	CH_4	N_2O	CO_2e (100-yr)	CO_2e (20-yr)
Max Year	258,004	152.50	2.087	263,119	271,156
Average Year	70,954	45.61	0.575	72,470	74,874
Life of Lease	2,696,260	1,733.16	21.844	2,753,871	2,845,209
Source: BLM Lease Sale Emissions Tool					

GHG emissions vary annually over the production life of a well as a result of declining production over time and **Figure 3** graphically shows the estimated GHG emissions profile over the production life of the lease including well development, well production operations, mid-stream, end-use, and gross (total of well development, well production, mid-stream, and end-use) emissions.

Figure 3. Estimated annual GHG emissions profile over the life of a lease.



Source: BLM Lease Sale Emissions Tool

To put the estimated GHG emissions for this lease sale in a relatable context, potential emissions that could result from development of the lease parcels for this sale can be compared to other common activities that generate GHG emissions and to emissions at the state and national level. The EPA GHG equivalency calculator can be used (https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator) to express the potential average year GHG emissions on a scale relatable to everyday life. For instance, the projected average annual GHG emissions from potential development of the subject lease are equivalent to approximately 15,619 gasoline-fueled passenger vehicles driven for one year, or the emissions that could be avoided by operating approximately 25 wind turbines as an alternative energy 0source or offset by the carbon sequestration of about 86,274 acres of forest land.

Table 11 compares estimated average annual lease-sale emissions to existing state GHG emissions, federal BLM fossil fuel (oil, gas, and coal) emissions, and U.S. fossil fuel and total GHG emissions reported in the EPA Inventory of U.S. GHG Emissions and Sinks: 1990-2020.

Table 11. Comparison of Lease Sale Annual Emissions to Other Sources (megatonnes)

Reference	Mt CO_2e (Per Year)	Average Year % of Reference
Lease Sale Emissions (Average Year)	0.074	-
ND Onshore Federal (Oil & Gas)	36.31	0.205%
U.S. Onshore Federal (Oil & Gas)	465.63	0.016%
U.S. Federal All (Oil &Gas)	844.27	0.009%
U.S. Federal (Oil, Gas and Coal)	1,292.57	0.006%
ND Total (all sectors)	69.33	0.104%
U.S. Total (all sectors)	5,973.00	0.001%

Notes:
1. Estimates are based on 100-GWP values.
2. Federal values come from the BLM Lease Sale Emissions Tool and BLM Specialist Report on Annual Greenhouse Gas Emissions Table ES-1 and ES-2. U.S Federal-All includes offshore oil and gas production.
3. U.S. Total Values come from the EPA Inventory of U.S. GHG Emissions and Sinks: 1990-2020 and use IPCC Fourth Assessment Report Global Warming Potentials.

Table 12 compares emission estimates over the 30-year life of the lease compared to the 30-year projected Federal emissions from existing wells, the development of approved APDs, and emissions related to reasonably foreseeable lease actions. Potential GHG emissions from the proposed action could result in emissions of approximately 2.75 Mt CO_2e over the life of the lease. Compared to emissions from other existing and foreseeable short-term Federal oil and gas development, the life of lease emissions for the proposed action would be approximately 0.73% of the short-term Federal fossil fuel authorization emissions and 0.060% of the U.S. short-term Federal emissions. In addition, if foreseeable long-term Federal oil and gas development and production-remains a constant percentage of projected energy demand, the estimated emissions from the life of the leases would be approximately 0.32% of the North Dakota Federal fossil fuel authorization emissions and 0.025% of U.S. Federal long-term emissions over the next 30 years.

Table 12. Comparison of the Life of Lease Emissions to other Federal Oil and Gas Emissions

Reference	Mt CO2e (100-yr)	Life of Lease % of Reference
Lease Sale Emissions (Life of Lease Emissions)	2.754	100%
ND Reasonably Foreseeable Short-term Federal (O&G)	379.63	0.725%
ND EIA Projected Long-term Federal (O&G)	956.83	0.288%
U.S. Short-term Federal (O&G)	4,614.81	0.060%
U.S. Long-term Federal (O&G)	13,560.24	0.025%

Source: U.S. and Federal emissions from BLM Lease Sale Emissions Tool and Annual GHG Report, Tables 5-17 and 5-18.

1. Short-term foreseeable projections are estimated Federal emissions from existing producing wells, approved APDs, and one year of leasing.
2. Long-term foreseeable are estimated Federal emissions to meet EIA projected energy demand.

Compared to emissions from other existing and foreseeable short-term Federal oil and gas development, the life of lease emissions for the proposed action is approximately 0.77% of Federal fossil fuel authorization emissions in North Dakota and about 0.0.06% of Federal short-term fossil fuel emissions in the nation (EPA , 2022). If foreseeable long-term Federal oil and gas development and production remains a constant percentage of EIA projected energy demand, then the estimated emissions in North Dakota from the life of leases is 0.289% of Federal emissions and about 0.020% of Federal long-term emissions in the nation over the next 30 years. In summary, potential GHG emissions from the proposed action could result in GHG emissions of approximately 2.75 Mt CO_2e over the life of the lease.

As detailed in the Annual GHG Report (BLM, 2022), which the BLM has incorporated by reference, the BLM also looked at other tools to inform its analysis, including the MAGICC model (see Section 7.0 of the Annual GHG Report). This model run suggests that "30-plus years of projected federal emissions would raise average global surface temperatures by approximately 0.0158 °C., or 1% of the lower carbon budget temperature target." As this is an assessment of what BLM has projected could come from the entire Federal fossil fuel program, including the projected emissions from the proposed action, over the next 30 years, the reasonably foreseeable lease sale emissions contemplated in this EA are not expected to substantially affect the rate of change in climate effects, bring forth impacts that are not already identified in existing literature, or cause a change in the magnitude of impacts from climate change at the state, national, or global scales.

3.4.4 Monetized Impacts from GHG Emissions

The social cost of greenhouse gases (SC-GHG), including carbon, nitrous oxide, and methane, are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year.

On January 20, 2021, President Biden issued E.O. 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*.[1] Section 1 of E.O. 13990 establishes an

[1] 86 FR 7037 (Jan. 25, 2021).

Administration policy to, among other things, listen to the science; improve public health and protect our environment; ensure access to clean air and water; reduce greenhouse gas emissions; and bolster resilience to the impacts of climate change.[2] Section 2 of the E.O. calls for Federal agencies to review existing regulations and policies issued between January 20, 2017, and January 20, 2021, for consistency with the policy articulated in the E.O. and to take appropriate action.

Consistent with E.O. 13990, the Council on Environmental Quality (CEQ) rescinded its 2019 "Draft National Environmental Policy Act Guidance on Considering Greenhouse Gas Emissions" and issued interim NEPA Guidance on Consideration of Greenhouse Gas Emissions and Climate Change, seeking public comment on the interim guidance through April 10, 2023. [3] GHG guidance, effective upon publication, builds upon and updates the CEQ's 2016 Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews. While CEQ works on updated guidance, it has instructed agencies to consider and use all tools and resources available to them in assessing GHG emissions and climate change effects including the 2016 GHG Guidance and 2023 interim guidance. [4]

Regarding the use of Social Cost of Carbon or other monetized costs and benefits of GHGs, the 2016 GHG Guidance noted that NEPA does not require monetizing costs and benefits.[5] It also noted that "the weighing of the merits and drawbacks of the various alternatives need not be displayed using a monetary cost-benefit analysis and should not be when there are important qualitative considerations."[6]

Section 5 of E.O. 13990 emphasized how important it is for federal agencies to "capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account" and established an Interagency Working Group on the Social Cost of Greenhouse Gases (the "IWG"). [7] "). In February of 2021, the IWG published *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide: Interim Estimates under Executive Order 13990*(IWG, 2021).[8] This is an interim report that updated previous guidance from 2016.

In accordance with this direction, this subsection provides estimates of the monetary value of changes in GHG emissions that could result from selecting each alternative. Such analysis should not be construed to mean a cost determination is necessary to address potential impacts of GHGs associated with specific alternatives. These numbers were monetized; however, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other impacts analyzed in this document. For instance, the BLM's overall economic analysis for this lease sale does not monetize most of the major costs or benefits and does not include all revenue streams from the proposed action but seeks to quantify certain impacts related to employment numbers and labor income. SC-GHG is provided only as a useful measure of the benefits of GHG emissions reductions to inform agency decision-making.

For Federal agencies, the best currently available estimates of the SC-GHG are the interim estimates of the social cost of carbon dioxide (SC-CO_2), methane (SC-CH_4), and nitrous oxide (SC-N_2O) developed by the Interagency Working Group (IWG) on the SC-GHG. Select estimates are published in the Technical Support Document (IWG 2021) and the complete set of annual estimates are available on the Office of

[2] *Id.*, sec. 1.
[3] 86 FR 1196 (January 9, 2023).
[4] *Id.*
[5] 2016 GHG Guidance, p. 32, available at: https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf
[6] *Id.*
[7] E.O. 13990, Sec. 5.
[8] https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

Management and Budget's website. The IWG's SC-GHG estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damages associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less significant factor in present-day decisions). The current set of interim estimates of SC-GHG have been developed using three different annual discount rates: 2.5%, 3%, and 5% (IWG 2021).

As expected with such a complex model, there are multiple sources of uncertainty inherent in the SC-GHG estimates. Some sources of uncertainty relate to physical effects of GHG emissions, human behavior, future population growth and economic changes, and potential adaptation (IWG 2021). To better understand and communicate the quantifiable uncertainty, the IWG method generates several thousand estimates of the social cost for a specific gas, emitted in a specific year, with a specific discount rate. These estimates create a frequency distribution based on different values for key uncertain climate model parameters. The shape and characteristics of that frequency distribution demonstrate the magnitude of uncertainty relative to the average or expected outcome.

To further address uncertainty, the IWG recommends reporting four SC-GHG estimates in any analysis. Three of the SC-GHG estimates reflect the average damages from the multiple simulations at each of the three discount rates. The fourth value represents higher-than-expected economic impacts from climate change. Specifically, it represents the 95th percentile of damages estimated, applying a 3% annual discount rate for future economic effects. This is a low probability, but high damage scenario, represents an upper bound of damages within the 3% discount rate model. The estimates below follow the IWG recommendations.

The SC-GHGs associated with estimated emissions from future potential development of the lease parcels are reported in **These estimates** represent the present value (from the perspective of 2021) of future market and nonmarket costs associated with CO2, CH4, and N2O emissions from potential well development and operations, and potential end-use. Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given emissions year and BLM's estimates of emissions in each year and rounded to the nearest $1,000. The estimates assume development will start in 2024 and end-use emissions complete in 2061, based on experience with previous lease sales.

Table 13. These estimates represent the present value (from the perspective of 2021) of future market and nonmarket costs associated with CO_2, CH_4, and N_2O emissions from potential well development and operations, and potential end-use. Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given emissions year and BLM's estimates of emissions in each year and rounded to the nearest $1,000. The estimates assume development will start in 2024 and end-use emissions complete in 2061, based on experience with previous lease sales.

Table 13. SC-GHGs Associated with Future Potential Development

	Social Cost of GHGs (2020$)			
	Average Value, 5% discount rate	**Average Value, 3% discount rate**	**Average Value, 2.5% discount rate**	**95th Percentile Value, 3% discount rate**
Development and Operations	$639,000	$2,392,000	$3,604,000	$7,152,000
Mid-Stream and End-Use	$34,660,000	$129,182,000	$194,689,000	$391,044,000
Total	$35,299,000	$131,574,000	$198,293,000	$398,196,000

3.4.5 Estimated GHG Emissions for Reasonably Foreseeable Environmental Trends and Planned Actions

The analysis of GHGs contained in the EA includes estimated emissions from the proposed leases. An assessment of GHG emissions from other BLM fossil fuel authorizations including coal leasing and oil and gas leasing and development is included in the BLM Specialist Report on Annual GHG Emissions (referred to as Annual Report, see Chapter 5). The Annual Report includes estimates of reasonably foreseeable GHG emissions related to BLM lease sales anticipated during the fiscal year, as well as the best estimate of emissions from ongoing production, and development of parcels sold in previous lease sales. It is, therefore, an estimate of cumulative GHG emissions from the BLM fossil fuel leasing program based on actual production and statistical trends.

The Annual Report provides an estimate of short-term and long-term GHG emissions from activities across the BLM's oil and gas program. The short-term methodology presented in the Annual Report includes a trends analysis of (1) leased federal lands that are held-by-production, (2) approved applications for permit to drill (APDs), and (3) leased lands from competitive lease sales occurring over the next annual reporting cycle (12 months), to provide a 30-year projection of potential emissions from Federal oil and gas lease actions over the next 12 months. The long-term methodology uses oil and gas production forecasts from the Energy Information Administration (EIA) to estimate GHG emissions out to 2050 that could occur from past, present, and future development of Federal fluid oil and gas. For both methodologies, the emissions are calculated using life-cycle-assessment emissions and data factors. These analyses are the basis for projecting GHG emissions from lease parcels that are likely to go into production during the analysis period of the Annual Report and represent both a hard look at GHG emissions from oil and gas leasing and the best available estimate of reasonably foreseeable cumulative emissions related to any one lease sale or set of quarterly lease sales.

Table 14 shows the aggregate GHG emissions estimate that would occur from Federal leases, existing and foreseeable, between the years 2022 and 2050, using the methodology described above. The 5-year lease averages include all types of oil and gas leases, including leases granted under the MLA as well as other authorities, that have been issued over the last five years. As such the projections made from the 5-year averages represent the potential for all types of future oil and gas development activity, and although not at exact acreages, include emissions that would be associated with the subject leases. However, they may also over-estimate the potential emissions from the 12-month cycle of competitive oil and gas leasing activities if the projected lease sale or development activity does not actually occur or is less than estimated.

Table 14. Reasonably Foreseeable Projected Emissions from Federal Lease Development

State (BLM Administrative Unit)	**GHG Emissions from Past, Present, and Foreseeable Federal Lease Development (Mt CO_2e per year)***
Alabama (ES)	9.34
Alaska	136.9
Arkansas (ES)	9.34
California	51.49
Colorado	243.1
Idaho	0.17
Illinois	0.31
Kansas (ES)	3.32
Kentucky (ES)	0.19
Louisiana (ES)	43.29
Michigan (ES)	1.95
Mississippi (ES)	2.89
Montana	58.82
Nebraska (WY)	0.21
Nevada	2.74
New Mexico	1,939.52
New York	0.01
North Dakota (MT)	379.63
Ohio (ES)	0.37
Oklahoma (NM)	20.43
Pennsylvania	0.46
South Dakota (MT)	2.31
Texas (NM)	49.55
Utah	187.84
Virginia	0.15
West Virginia (ES)	0.45
Wyoming	1,487.65
Total	**4,614.81**
*Emissions obtained from 2021 Annual Report, Figure 5-1	

The most recent short-term energy outlook (STEO) published by the EIA (https://www.eia.gov/outlooks/steo/) (EIA, 2023) predicts that the world's oil and gas supply and

consumption will increase over the next 18-24 months. The latest STEO projections are adequate to use for the No Action discussion as the global forecast models used for the STEO are not dependent on whether the BLM issues onshore leases but are based on foreseeable short-term global supply and demand and include oil and gas development /operations on existing U.S. onshore leases. The most recent STEO includes the following projections for the next two years:

- Global liquid fuels consumption is projected to be 101.34 million barrels per day (b/d) in 2023 and increase to 103.02 million b/d in 2024.
- U.S. crude oil production averaged 11.89 million b/d in 2022. Production is expected to average 12.53 million b/d in 2023 and to rise to 12.69 million b/d in 2024.
- Natural gas production is expected to average 101.09 Bcf/d in 2023 and 101.24 Bcf/d in 2024.
- U.S. LNG export capacity increases will contribute to LNG exports of 12.11 Bcf/d in 2023, up from 10.59 Bcf/d in 2022. LNG exports are predicted to average 12.73 Bcf/d in 2024.
- Coal production is expected to total 577.1 million short tons (MMst) in 2023, down from 597.2 MMst in 2022. Among the drivers of the decline in coal production is the ongoing retirement of coal-fired generating plants, low natural gas prices, and more renewable generation. The 2024 projected coal production is expected to decrease to 491.2 MMst.
- Generation from renewable sources will make up an increasing share of total U.S. electricity generation, rising from 22% in 2022 to 26% in 2024.

Based on recent events both domestically and internationally that have resulted in abrupt changes to the global oil and gas supply, other EIA studies and recent U.S. analyses (associated with weather impacts, etc.) regarding short-term domestic supply disruptions and shortages or sudden increases in demand demonstrate that reducing domestic supply (in the near-term under the current supply and demand scenario) will likely lead to the import of more oil and natural gas from other countries, including countries with lower environmental and emission control standards than the United States. Current global supply disruptions have also led to multiple releases from the U.S. Strategic Petroleum Reserve in order to meet consumer demand and curb price surges.

The EIA 2023 Annual Energy Outlook (https://www.eia.gov/outlooks/aeo/) projects energy consumption increases in the U.S. through 2050. In the AEO 2023, crude oil production is forecast to rise in 2023 with production then remaining relatively flat through 2050. However, renewable energy will be the fastest-growing U.S. energy source through 2050. Overall, U.S. energy-related CO_2 emissions are projected to drop 25% to 38% below the 2005 level by 2030 driven primarily by increased electrification, equipment efficiency, and renewable technologies for electricity generation. Further discussion of past, present, and projected global and state GHG emissions can be found in Chapter 6 of the Annual Report.

3.4.6 Mitigation Strategies

GHG emissions contribute to changes in atmospheric radiative forcing resulting in climate change impacts. GHGs act to contain solar energy loss by trapping longer wave radiation emitted from the Earth's surface and act as a positive radiative forcing component. The buildup of these gases has contributed to the current changing state of the climate equilibrium towards warming. Chapters 8 and 9 of the Annual Report provides a detailed discussion of climate change science, trends, and impacts. The relationship between GHG emissions and climate impacts is complex, but a project's potential to contribute to climate change is reduced as its net emissions are reduced. When net emissions approach zero, the project has little or no contribution to climate change. Net-zero emissions can be achieved through a combination of

controlling and offsetting emissions. Emission controls (e.g., vapor recovery devices, no-bleed pneumatics, leak detection and repair, etc.) can substantially limit the amount of GHGs emitted to the atmosphere, while offsets (e.g., sequestration, low carbon energy substitution, plugging abandoned or uneconomical wells, etc.) can remove GHGs from the atmosphere or reduce emissions in other areas. Chapter 10 of the Annual Report provides a more detailed discussion of GHG mitigation strategies.

The Federal government includes several agencies that work responsibly in concert for implementing climate change strategies and meeting U.S. emissions reduction goals all while supporting U.S. oil and gas development and operations. The EPA is the Federal agency charged with regulation of air pollutants and establishing standards for protection of human health and the environment. EPA has issued regulations that will reduce GHG emissions from any development related to the proposed leasing action. These regulations include the New Source Performance Standard for Crude Oil and Natural Gas Facilities (49 CFR § 60, subpart OOOOa) which imposes emission limits, equipment design standards and monitoring requirements on oil and gas facilities. A detailed discussion of existing regulations and Executive Orders that apply to BLM management of federal lands as well as current Federal and state regulations that apply to oil and gas development and production can be found in Chapter 2 of the Annual Report.

In addition to these Federal regulations, states have also implemented air quality and greenhouse gas regulations for the oil and gas industry. The North Dakota Department of Mineral Resources - Oil and Gas Division, regulates the drilling and production of oil and gas including regulations that ban the venting of natural gas and require that vented casinghead gas be burned through a flare (North Dakota Administrative Code 43-02-03-45). The North Dakota Industrial Commission (NDIC) has jurisdiction over the volume of gas flared at a well site to conserve mineral resources and established Order No. 24665 for reducing gas flaring. The Order requires producers to submit a gas capture plan with every drilling permit application. The North Dakota Department of Environmental Quality – Division of Air Quality has established permitting and reporting requirement for oil and gas facilities under North Dakota Air Pollution Control Rules Chapter 33.1-15-20 and submerged fill and flare requirements in Chapter 33.1-15-07.

The majority of GHG emissions resulting from federal fossil fuel authorizations occur outside of the BLM's authority and control. These emissions are referred to as indirect emissions and generally occur off-lease during the transport, distribution, refining, and end-use of the produced federal minerals. The BLM's regulatory authority is limited to those activities authorized under the terms of the lease which primarily occur in the "upstream" portions of natural gas and petroleum systems. This decision authority is applicable when development is proposed on public lands and BLM assesses its specific location, design, and proposed operation. In carrying out its responsibilities under NEPA, the BLM has developed Best Management Practices (BMPs) designed to reduce emissions from field production and operations. BMPs may include limiting emissions on stationary combustion sources, mobile combustion sources, fugitive sources, and process emissions occurring on a lease parcel. Analysis and approval of future development may include application of BMPs within BLM's authority, as Conditions of Approval or Lease Stipulations, to reduce or mitigate GHG emissions. Additional measures proposed at the project development stage may be incorporated as applicant-committed measures by the project proponent or added to necessary air quality permits. Additional information on mitigation strategies, including emissions controls and offset options, are provided in Chapter 10 of the Annual GHG Report.

3.5 Issue 3 – Socioeconomic Conditions, Environmental Justice, and Human Health

3.5.1 Affected Environment

The social and economic environment of the counties containing the parcels proposed are described in detail in their associated RMP and FEIS. This section provides updated estimates of environmental justice indicators within the study area, which includes all the counties containing the Federal parcels covered in this EA.

Environmental Justice is an initiative that culminated with President Clinton's February 11, 1994, Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" and an accompanying Presidential memorandum. Executive Order 12898 requires the analysis of disproportionately high and adverse human health effects and environmental effects on environmental justice populations. Environmental effects may include "ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment" (CEQ 1997 page 26) and that each Federal agency consider environmental justice to be part of its mission. Specific to the NEPA process, the EO requires that proposed projects are evaluated for "disproportionately high adverse human health and environmental effects on minority populations and low-income populations.

The Environmental Protection Agency (EPA 2016) guidelines for evaluating the potential environmental effects of projects require specific identification of minority populations when either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997). Additionally, the EPA states that "A minority population exists "if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). For minority populations, the BLM generally defines "meaningfully greater" as 10 percent above the minority population size of the comparison geography. A potential low-income population is identified by the BLM if either 1) low-income populations of the area of analysis exceed 50% of the population, or 2) the low-income population is less than or equal to twice (200%) of the federal "poverty level". Indigenous communities of concern are present if the percentage of the population identified as indigenous, including non-tribal-affiliated persons who identify as indigenous or a combination of indigenous and another ethnicity, is equal to or greater than that of the reference population(s) (see Federal Interagency Working Group on Environmental Justice and NEPA Committee 2016; BLM 2022).

When evaluating potential EJ concerns under NEPA, one "may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect" (CEQ 1997). The reference areas are the states of Montana and North Dakota.

The BLM used the EPA's EJScreen tool, the Headwaters Socioeconomic Profiling (SEP) Tool (US DOC 2022), and the BLM Socioeconomic Profile tool (SEP) to collect data presented **Table 15**. Low-income, minority, and indigenous populations exist within the study area and may be disproportionately affected by project actions. Some populations identify as more than one environmental justice indicator and may warrant special attention, outreach, and meaningful involvement.

Table 15. Minority, Low-Income, and Total Populations

Headwaters Economic Profile System and BLM Socioeconomic Profile (SEP)** Data							EPA EJ Screen	
County	**Pop. 2010 2021 % change**	**Race**	**Pop. by race**	**% of total pop by race**	**% total minority population****	**% low-income****	**% People of color ND average = 16%**	**% Low-income ND average = 25%**
McKenzie	6004 13762 +129.2%	W	11040	80.2%	24.7%	30.4%	23%	26%
		B/AA	264	1.9%				
		AI	1505	10.9%				
		A	59	0.4%				
		NH/OPI	0	0.0%				
		O	232	1.7%				
		2+	662	4.8%				
		HoLH	1359	9.9%				

W = White alone B/AA = Black or African American alone AI = American Indian alone A = Asian alone NH/OPI = Native Hawaiian or Other Pacific Is. alone O = Some other race 2+ = 2 or more races HoLH = Hispanic or Latino Heritage
For the purposes of this analysis, SEP data does not include Hispanic or Latino Heritage in the percentage of total minority population. See **Appendix O

Source: https://headwaterseconomics.org/apps/economic-profile-system/ , ejscreen.epa.gov/mapper/, and headwaterseconomics.org/tools/blm-profiles/
Accessed 05.03.2023

The counties with proposed parcels have an estimated population of 13,762 as shown on **Table 15.** McKenzie County ND is the home for American Indian and Alaska Native populations that meet the criteria for Environmental Justice populations. In North Dakota 11% of the population of McKenzie Co. are American Indian or Alaska Native, while ND's overall population of American Indian and Alaska Native represents 5% of the total statewide population. Similarly, 10% of McKenzie County's population is Hispanic or Latino Heritage (any race), while the percentage of North Dakota's overall population from this cohort is 4.1%. (**Appendix L,O**).

Economic Conditions

The social and economic environment of the counties containing the parcels proposed are described in detail in their associated RMP and FEIS. This section focuses upon economic aspects related to the potential Federal oil and gas lease sales.

Mineral rights can be owned by private individuals, corporations, Indian tribes, or by local, State, or Federal Governments. Typically, companies specializing in the development and extraction of oil and gas lease the mineral rights for a particular parcel from the owner of the mineral rights. Federal oil and gas leases are generally issued for 10 years unless drilling activities result in one or more producing wells.

Once production has begun on a federal lease, the lease is held by production and the lessee is required to make royalty payments to the Federal Government.

Table 16. Total and Average Annual Bonus Bid and Rental Payments for Existing Oil and Gas Leases on Non-Indian Federal Mineral Estates (2018-2022)

County	Bonus Bids[1]	Rents	Total	Average Annual
McKenzie ND	-$461,117	$155,389	-$305,728	($61,146)
Grand Total	-$461,117	$155,389	-$305,728	($61,146)

Source: ONRR data, https://revenuedata.doi.gov/downloads/federal-revenue-by-location/ accessed 5/14/2023.
[1] Negative Bonus Bid values may be due to companies correcting errors in royalty, rental and bonus bid payments. If the correction takes place in a different year than the original payment, it appears as a negative entry in the total.

Table 16 provides information on rental and bonus bid revenue from existing oil and gas leases for the county that has parcels nominated for the proposed leasing action. Existing Federal oil and gas leases on Federal non-Indian properties located in this county produced $155 thousand dollars in rental income between 2018 and 2022; note that the negative bosun bid totals are due to overpayments or other accounting adjustments. The leasing of these minerals supports local employment and income and generates public revenue for surrounding communities. The economic contributions of Federal fluid mineral leasing actions are largely influenced by the number of acres leased, and can be measured in terms of the jobs, income, and public revenue generated. Additional details on the economic contribution of Federal fluid minerals are discussed in the RMP and FEIS covering the location of the parcel. Bonus

Leasing mineral rights for the development of Federal minerals generates public revenue through the bonus bids paid at competitive lease auctions and annual rents collected on leased parcels not held by production. Nominated parcels approved for oil and gas leasing are offered by the BLM at a minimum bid rate of $10 per acre at the competitive lease sale. In addition to bonus bids, lessees are required to pay rent annually until production begins on the leased parcel, or until the lease expires. These rent payments are equal to $3.00 an acre for the first two years, $5.00 an acre for years 3 through 8, and $15.00 an acre for the years 9 and beyond (for a lease not held in production). Additionally, Federal oil and gas production in Montana is subject to production taxes or royalties. The Federal oil and gas royalties on production from public domain minerals equal 16.7 percent of the value of production (43 CFR § 3103.3.1).

A portion of these Federal revenues are distributed to the State and counties where the parcels are located. The amount that is distributed is determined by the Federal authority under which the Federal minerals are being managed. Forty-nine percent of Federal revenue associated with oil and gas from public domain lands are distributed to the State. For example, in Montana, 25% of the rental and bonus bid revenues that the State receives are redistributed to the counties of production (Title 17-3-240, MCA). Twenty-five percent of bonus bid, and rental revenues associated with oil and gas development from Bankhead-Jones lands are distributed to counties where the parcels are located. Distribution of Federal royalties and leasing revenues to the State for oil and gas development on other Federal acquired lands differs based upon the authority associated with those lands. Generally, the revenue associated with oil and gas leasing and development that is received by the State and counties help fund traditional county functions such as enforcing laws, administering justice, collecting, and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, and/or keeping records. Other county functions that may be funded include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems.

Environmental Justice Populations

Based on **Table 15**, we can determine that low-income populations McKenzie County have a percentage of low-income populations, the percentages fall below the state averages. The low-income, minority, and indigenous communities of potential concern within the analysis area constitute potential populations at risk for adverse health outcomes due to demographic or socioeconomic factors (Headwaters Economics 2022). The EPA has also concluded that the most severe harms from climate change fall disproportionality upon historically underserved communities (EPA 2021b). Aside from ethnicity and poverty status, other factors contributing to increased health risks for potential communities of concern in the analysis area include, but are not limited to, age, education, and employment.

While the determination of potential adverse and disproportionate historical effects from specific previous actions may initially be the assessment of the BLM, this assessment should not be assumed to be the position of specific, potentially affected communities of concern. The BLM realizes that additional adverse impacts may be identified by local communities as specific development locations and types are proposed. Identified communities of potential concern would also be provided opportunities to identify any perceived adverse environmental impacts at the time of site-specific analysis during the APD stage. This discussion addresses only the effects for the issues identified by the BLM during scoping and public comment periods. The BLM would continue to work with potentially affected communities of concern to identify and address additional environmental justice issues as they arise.

Potential Populations at Risk for Disproportionate Impacts in the Project Area

Per headwaterseconomics.org, some populations are more likely to experience adverse social, health, and economic outcomes due to their race, age, gender, socioeconomic status, and other indicators, such as language proficiency. The North Dakota indicators analyzed, in addition to minority and low-income data presented previously, (see **Appendix M**) include educational attainment, language proficiency, households receiving public assistance, labor participation, housing affordability, potentially vulnerable households (elderly living alone, single female households, single female households with children), and potentially vulnerable people (noninstitutionalized and disabled or those without health insurance).

While low-income and minority indicators were analyzed to establish an environmental justice baseline for populations in the project area, impacts to these populations can be further exacerbated by other, concurrently present population risk indicators. For example, low-income populations are more likely to have inadequate housing, live and/or work in areas with greater exposure to environmental hazards, have an overall lack of access to resources that leads to poorer health outcomes and a lesser likelihood of having health insurance. Taking the example further, low-income households receiving public assistance may use a larger amount of their household budget to meet the basic necessities of life, including housing, food, and transportation. Housing affordability data is also a useful population indicator for potential disproportionate impacts, as housing affordability typically does not affect all populations equally given variable ratios of monthly income vs. rent or mortgage costs in an area . Last, households with potentially vulnerable populations (including people over the age of 65, single females, and households with children under the age of 18) are more likely to live in poverty, experience food insecurity, tend to be less educated, and are typically disproportionately affected by heat-related illnesses and social isolation (**Appendix M** Populations at Risk).

Table 17 shows us that potential populations at risk for disproportionate impacts exist in McKenzie County where risk indicator values are greater than respective state averages for educational attainment, labor participation, affordable housing, and potentially vulnerable households and people in nearly all counties within the project area.

Table 17 Potential Populations at Risk for Disproportionate Impacts in the Project Area

	Potential Populations at Risk for Disproportionate Impacts in the Project Area			
	Educational Attainment	**Language Proficiency**	**Households Receiving Public Assistance (SSI, Cash, SNAP)**	**Labor Participation**
State Average	ND = 6.7%	ND = 0.7%	ND = 2.9%, 2.1%, 6.4%	ND = 13.9%
County				
McKenzie	6.7%	1.3%	3.7%, 1.2%, 2.3%	17.7%
	Housing Affordability	**Potentially vulnerable households (>65yo, sf,<18yo)**	**Potentially Vulnerable People (N + disabled, N+ no insurance)**	
State Average	MT = 28.7%, 40.3% ND = 18.5%, 36.4%	MT = 4.8%, 7.9%, 5.2% ND = 5.1%, 7.7%, 5.6%	MT = 13.8%, 8.6% ND = 11.1%, 7.5%	
County				
McKenzie	21.1%, 27.8%	2.6%, 9.7%, 7.7%	10.2%, 17.9%	
*Educational Attainment - % of the population that *has not* achieved a high school education or equivalent				
*Language Proficiency - % of people who speak English "not well"				
*Households Receiving Public Assistance – Social Securing Income, Cash assistance, Supplemental Nutrition Assistance Program				
*Labor Participation - % of the population that did *not* work				
*Housing Affordability - Mortgage > 30% of household income, and Rent > 30% of household income				
*Potentially vulnerable households – greater than 65 years old living alone, Single female households, households with children under the age of 18				
*Potentially vulnerable people - noninstitutionalized and disabled, noninstitutionalized without health insurance				

Source: See **Appendix M**. Data sources US Department of Commerce, 2022. Census Bureau, American Community Survey Office, Washington DC. https://headwaterseconomics.org/apps/economic-profile-system/ Accessed 04.25.2023

Human Health

Literature has indicated that there are many effects to human health associated with oil and gas development, particularly (but not exclusively) in areas that are proximal to high development. Some of these effects are:

- Reproductive harms including birth defects, low birth weight, preterm births, and miscarriages
  - McKenzie et. al (2014) analyzed the associates between density and proximity of natural gas wells within a 10-mile radius of a maternal residence. The study suggested that there was an association between density of and proximity to natural gas wells and increased birth defects.
  - Tran, et al (2021) monitored births to mothers in eight California counties between 2006 and 2015 where the individuals were exposed to hydraulic fracturing by at least one well within one kilometer of their residence during pregnancy. The study suggests that although hydraulic fracturing exposure may influence birth outcomes there are other factors involved including urban ambient air pollution that may affect the birth weight and size.

- Respiratory health effects including asthma, lung disease, and breathing difficulty
    - Outdoor air pollutants, including ozone, particulate matter, nitrogen dioxide, and sulfur dioxide, are recognized cause of asthma (Rasmussen et al. 2016).
- Possible disruption of the endocrine system
    - Kassotis, et al (2016) determined that the contamination of surface and groundwater was one source of Endocrine-disrupting chemicals to the human body via contamination of sources of drinking water, the other being air as the route of exposure for humans by means of inhalation exposure from surface spills and associated oil and gas infrastructure.
- Cancer (lung cancer and other types of cancer);
    - Carcinogens associated with oil and gas development include aromatic petroleum hydrocarbons (benzene, toluene, ethyl benzene, and xylenes (BTEX)) and diesel exhausts (Adgate et al 2014).
- Injuries
    - Motor vehicle injuries and fatalities, and other health and safety risks associated with increased vehicle traffic (and the air pollutants it emits) from oil and gas development;
        - The most common type of accident were traffic and single-vehicle rollovers (Adgate et. al 2014);
    - Fatalities from explosions, fires, spills, and leaks;
        - …the fatality rate is 2.5 times the rate of the construction industry and 7x higher than the general industry rate from 2005 to 2009. Adgate et.al (2014)
- Trauma and psychological stress.
    - Malin (2020) indicates that stressors and mental health from the institutional mechanisms associated with fossil fuel development are associated with 1) uncertainty, due to inaccessible, untransparent information about environmental and public health risks and 2) powerlessness to meaningfully impact regulatory or zoning processes.
- Climate Change and Greenhouse Gases
    - Based on a 100-year global warming potential, future potential development of the nominated lease parcels is estimated to result in 57,565 metric tons of carbon dioxide equivalent (CO2e) from construction and operation and 3,312,760 metric tons of CO2e from downstream GHG emissions.

3.5.2 No Action Alternative Effects

Economic Effects—No Action Alternative

Under the No Action Alternative, none of the nominated parcels would be offered for sale and no Federal bonus bid or rental incomes would be received for the parcels awarded leases. Existing Federal leases for oil and gas properties would continue to generate rental income.

Environmental Justice and Human Health Effects – No Action Alternative

Under the No Action Alternative, none of the nominated parcels would be offered for sale and no additional disturbance or effects would result from the lack of sale. Under the No Action alternative, it is not anticipated that there would be any specific disproportionate adverse impacts to EJ populations living withing the analysis area.

3.5.3 Proposed Action Alternative Effects

Economic Effects – Proposed Action Alternative

Under Alternative B, the complete set of proposed parcels would be offered for sale. Those parcels that are successfully leased will generate Federal bonus bid revenue and annual rents, which will be collected on leased parcels not held by production. As described in **Economic Conditions**, these revenues are collected by the Federal government, which then distributes a portion of the revenues collected to the State and counties. The amount that is distributed is determined by the Federal authority under which the Federal minerals are being managed.

Table 18. Alt B - Estimated Federal Revenue Associated with the September 2023 Lease Sale

		Alternative B							Total Rental Income and Bonus Bids Collected over 10-Year Lease 1,2			
Field Office	County	# Parcels	BLM Surface	Non-Fed Surface (Split Estate)	USFS Surface	Total Acres	Rental over 10 Years	Bonus Bid (Min. $10.00/ acre)[1,2]	Federal	State	County/ Local	Total
NDFO	McKenzie	32			10,735.0	10,735.0	$711,612	$107,820	$417,910	$303,190	$98,332	$819,432
	F.O. Total	32			10,735.0	10,735.0	$711,612	$107,820	$417,910	$303,190	$98,332	$819,432
Total		**32**			**10,735.0**	**10, 735.0**	**$711,612**	**$107,820**	**$417,910**	**$303,190**	**$98,332**	**$819,432**

In this analysis, Federal leasing revenue estimates (lease rent and bonus bids) are based upon the number of acres being offered. There are no guarantees that any of the parcels offered for lease will receive bids, and until the lease sale is conducted it is unknown which and how many of the offered parcels will be leased.

Due to energy market volatility and the dynamics of the oil and gas industry, the BLM cannot predict the exact economic effects of this leasing action. These effects are specific to which successfully leased parcels will be developed and which developed parcels will produce paying quantities of Federal fluid minerals.

Given this uncertainty, in this analysis revenue estimates are limited to the direct effects of leasing and are calculated under the following assumptions:

1. All of the proposed parcels will be sold.
2. Federal rental income will be collected during the full term of the leases (10 years).
3. All parcels are leased at the regulatory minimum bonus bid and rental rates.

The estimates based upon these assumptions are provided in **Table 18.** Alternative B would generate bonus bids totaling $107,820 and annual rental income totaling $711,612. The total value of all rentals and bonus bids received over 10-year leases for all parcels would be $819,432.

As noted above, Federal rental income and bonus bids from the lease sale described in Alternative B would be shared with the State and county where the parcel is located. During the term of these leases the Federal government would collect $418 thousand, the State ND would collect and retain $303 thousand, and local governments in the counties containing the parcels would share $98 thousand in rental and bonus bids.

Environmental Justice and Human Health Effects – Proposed Action Alternative

The reasonably foreseeable development (RFD) scenario for the proposed action is 12 oil and/or gas wells

for all parcels nominated (See **Table 2** and **Appendix D**). Of the estimated number of wells the estimation for the North Dakota Field Office (McKenzie County) is 12 oil wells. There are unique properties within 1km of the proposed lease parcels as discovered by conducting a GIS survey using aerial basemaps. It is undetermined if these properties are residences, and if so, if the residences are occupied as of the date of this analysis. For all parcels, an attempt to mitigate any disproportionately high and adverse human health and environmental effects of development near these residences is required through the application of 43 CFR § 3101.1-2. The setback requirement from residences or occupied dwellings of 500 feet (152.4m) stems from 43 CFR § 3101.1-2 Surface Use Rights, where the Authorized Officer may require reasonable measures to minimize adverse effects to other resource values, land uses, and uses not address in lease stipulations at the time operations are proposed. Federal Regulation 43 CFR § 3101.1-2, Surface Use Rights, allows the authorized officer to move the proposed operations as far as 656 feet (200m) from the proposed action. This lease notice is also applicable to all related facilities. Additionally, Standard Lease Notice STD 16-3 specifies that development is generally restricted within a quarter mile of occupied dwellings and within 500 feet of riparian habitats and wetlands, perennial water sources (rivers, springs, water wells, etc.) and/or floodplains. Intensity of impact is likely dependent on the density of development and surrounding, proximal populations.

The likelihood of additional disproportionately high and/or adverse human health and environmental effects to the identified populations is quite low, based on the reasonably foreseeable development scenarios for all parcels. Many of the human health issues identified above are associated with populations who live in close proximity to dense, long-term oil and natural gas development. The studies referenced analyzed rural populations that are comparable or larger than many of the largest cities in the state of North Dakota and although the effects of living in close proximity to oil and natural gas development cannot be discounted, these scenarios may not the case in this lease sale. Although the counties included in this sale have at-risk, low income, and minority populations (SEP data, **Table 15**), oil and natural gas development in these areas would affect only immediately proximal communities or residences for a short period of time to a likely smaller degree.

While the determination of potential adverse and disproportionate effects from specific actions may initially be the assessment of the BLM, this assessment should not be assumed to be the position of specific, potentially affected communities of concern. The BLM realizes that additional adverse impacts may be identified by local communities as specific development locations and types are proposed. Therefore, identified communities of concern would be provided opportunities to identify any perceived adverse environmental impacts at the time of site-specific analysis during the APD stage. As a result, this discussion assesses only the effects for the issues identified by the BLM. The BLM would continue to work with potentially affected communities of concern to identify and address additional EJ issues as they arise.

Potential adverse impacts associated with oil and gas developments can be different for different communities. As discussed previously, the populations displaying higher risk indicators (presented in **Table 17**) are more likely to experience adverse health outcomes due to the presence of these indicators including educational attainment, language proficiency, households receiving public assistance, labor participation, housing affordability, potentially vulnerable households, and potentially vulnerable people. Therefore, immediately proximal communities of potential concern may be more sensitive to the impacts from potential health and safety risks associated with future potential and proximal development of the lease parcels relative to immediately proximal non-EJ communities. Similarly, quality of life impacts could be greater for the residents or communities in close proximity to future potential development. As stated above, there are unique properties within 1km of the proposed lease parcels. It is undetermined if these properties are residences, and if so, if the residences are occupied as of the date of this analysis. It should be noted that all of these unique properties are located in remote rural areas.

Air quality, greenhouse gases, climate change, and water use and availability are all issues that could potentially disproportionately affect the populations identified in **Table 15** and **Table 17**. Fugitive dust and diesel exhaust emissions from construction would result in criteria pollutant, VOC, and HAP emissions in the short-term. These emissions would occur for 30-60 days and would most likely impact locations near where these activities occur. Air quality impacts and associated health impacts can disproportionately affect potential populations of concern in the analysis area who are already socially vulnerable and likely have greater difficulty accessing healthcare facilities, paying for medical treatment, and typically have a higher propensity for pre-existing health conditions (EPA 2021b). While any climate change-related effects from the future potential development of the parcels themselves would be minimal, climate change is the result of collective and global actions. Any climate change-related impact would be regional in nature but may still disproportionately affect individuals within potential communities of concern in the analysis area who are already vulnerable (EPA 2021b). While any climate change-related effects from the future potential development of the parcels themselves would be minimal, climate change is the result of collective and global actions. Any climate change-related impact would be regional in nature but may still disproportionately affect individuals within potential communities of concern in the analysis area who are already vulnerable (EPA 2021b)

Groundwater resources are also regional in nature and water withdrawals are not anticipated to affect domestic water sources (see section 3.7 for water resources discussion). Any impacts to local water wells (for example, a spill that affects groundwater) could force residents to find other means of supplying water for domestic or agricultural use. Best Management Practices (BMPs) and Conditions of Approval (COAs) to an APD would be implemented to minimize this risk. Should a spill occur, the BLM would work with operators to immediately remediate spills in accordance with federal and state standards. See appendices A and B for applied stipulations.

Additional NEPA review of potential disproportionately adverse impacts, including to human health and safety, would be conducted at the time of proposed lease development. When evaluating placement of wells at the lease development stage, standard design features, standard terms, BMPs, and COAs applied at the time of APD approval could include additional measures to reduce health and safety effects on nearby communities of potential concern. Future potential development would also be subject to relevant rules and regulations (federal and state) regarding public health and safety.

3.6 Issue 4 – Water Resources

What are the direct, indirect, and cumulative effects of potential oil and gas development, including hydraulic fracturing, on parcels that may be offered for lease on surface and groundwater quality and quantity?

BLM Montana/Dakotas developed a hydraulic fracturing (fracking) white paper that describes industry practices commonly associated with fracking, as well as regulations designed to protect water resources. This white paper is included as **Appendix F** to this EA, and the information is incorporated by reference into this water resources analysis.

The North Dakota Office of the State Engineer & State Water Commission regulate the right to use surface and groundwater in North Dakota. State laws require that water rights be established for all beneficial uses of water, including that used for oil well development (drilling and hydraulic fracturing). Depending on location, new water rights or changes to existing water rights may apply (http://dnrc.mt.gov/divisions/water/water-rights/docs/oil- gas/water_options_oil_development.pdf).

In addition, the State administers numerous water quality regulations including the Clean Water Act of 1977, the Water Resources Planning Act of 1962, the Pollution Prevention Act of 1990, and the Safe Drinking Water Act of 1977. The Antidegredation Policy in the Clean Water Act mandates the

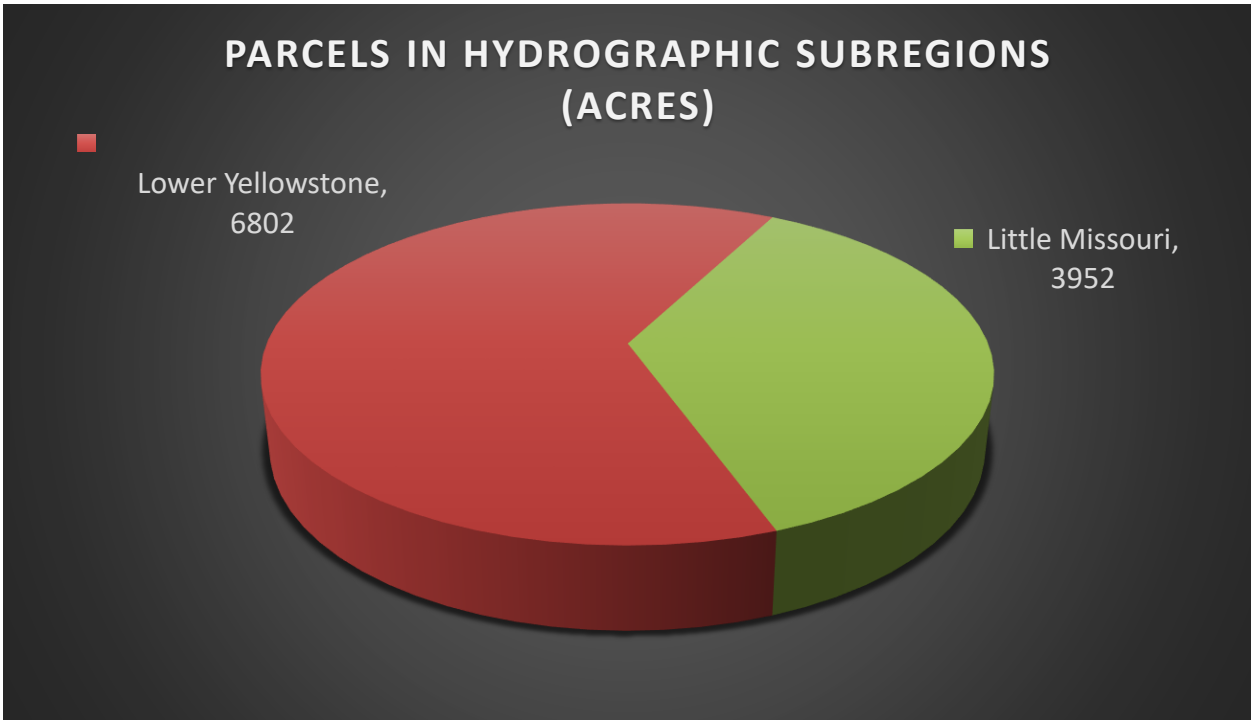
maintenance of the level of water quality that has been identified as being necessary to support the existing uses of a waterbody (40 CFR § 131.12(a)). Wastewater will be disposed of in accordance with state, local and federal regulations, including HB1409-38-11.2-07 (North Dakota) and ARM Rules 36.22.1005 & 36.22.1226 (Montana).

3.6.1 Affected Environment

Lease parcels associated with the September 2023 lease sale are distributed throughout the hydrographic subregions (HUC-6) identified in **Figure 4** below. Of these subregions, the majority of the lands are in the Lower Yellowstone subregion; the remainder is in the Little Missouri subregion.

Pursuant to CWA section 303(d)(1), 33 U.S.C. § 1313(d)(1), each state is further required to identify those waters that do not meet water quality standards—called the "303(d)(1) list." The 303(d) list is short for a state's list of impaired and threatened waters. States are required to submit their list for EPA approval every two years. For each water on the list, the state identifies the pollutant causing the impairment, when known. The BLM has identified through the EPA WATERS Geoviewer website which parcels nominated for this lease sale have proximity to impaired water bodies (See **Appendix H**).

Figure 4. Distribution of Lease Parcels throughout the Hydrographic Subregions associated with the September 2023 lease sale (Note: Subregions represent the 4-digit hydrologic unit codes associated with the USGS' Watershed Boundary Dataset, 2017)



Surface Water

Most of the consumptive water use in the region comes from surface water, which is especially critical for agricultural operations. According to the National Hydrography Dataset (NHD High_92V.210), the parcels contain approximately:

0 miles of perennial streams
- 37.8 miles of intermittent/ephemeral streams
- 1.6 miles of canals and ditches
- 1.9 acres of intermittent lakes/ponds
- 23.9 acres of perennial lakes/ponds
- 0 springs and seeps
- 0 acres of swamp/marsh

Portions of lease parcels that border the Missouri River in McKenzie County is within the 100-year floodplain as mapped by the FEMA flood hazard maps or within the high-water marks of the Missouri River. Access to mineral interests on these lease portions will have to be accessed by directional or horizontal wells that are already commonly used in the surrounding acreage. All other parcels are within areas defined as "Areas of Minimal Flood Hazard" or in areas that have not been mapped for flood hazards by FEMA. Mapping by FEMA is incomplete across the majority of these leases, especially in remote areas where impacts to life and property are limited (relative to areas with more substantial human development). Site specific assessments of flood hazard would be completed for any subsequent Surface Use Plan of Operations.

Streamflow in the area varies seasonally, with the largest flows commonly occurring in the spring or early summer. Water quality is often indirectly tied to streamflow, as it is largely dependent on the relative contributions of runoff and groundwater. Water quality affects the degree to which water can be used for a beneficial use and monitoring indicates that water quality in the region has been affected by a suite of factors; While the sources of water quality impairment vary considerably among waterbodies, nonpoint source pollution, nutrients, stream alteration, total suspended solids and metals are often listed as the primary causal factors (*Montana 303(d)/305(b) Integrated Report, 2020; North Dakota Integrated Section 305(b) Water Quality Assessment Report, 2018*). The BLM is required to comply with state water quality standards and utilizes BMPs to avoid, minimize, or mitigate potential impacts that could contribute to water quality impairment.

Consumptive Uses

Type, source, and volume of water use varies within and between hydrographic subregions. Most water used in hydraulic fracturing comes from surface water sources such as lakes, rivers, and municipal supplies. However, groundwater can be used to augment surface water supplies where it is available in sufficient quantities. The amount of water used in hydraulic fracturing, particularly in shale gas formations, may appear substantial, but is often small when compared to other water uses such as agriculture and municipal supply.

Groundwater

Groundwater plays an important role in meeting regional demands for water. For example, while less than three percent of water diverted in Montana for beneficial uses in calendar year 2000 was from groundwater, 95 percent of the rural, self-supplied domestic systems operate on groundwater sources (Montana Department of Natural Resources, *Water Fact Sheet #4*). Local groundwater conditions within the vicinity of the lease parcels are highly variable and the quality and availability of groundwater varies greatly across the region. Residents commonly get their groundwater from aquifers consisting of unconsolidated, alluvial valley-fill materials, glacial outwash, consolidated sedimentary rock formations, and some coal beds.

Aquifers in Western Montana are typically in unconsolidated, alluvial valley-fill materials within intermontane valleys. These intermontane valley aquifers often yield relatively large quantities of high-

quality water to relatively shallow water wells. Conversely, within the Northern Great Plains (eastern Montana & Western North/South Dakota), bedrock aquifers are often an important source of groundwater (especially in the non-glaciated zone). These aquifers generally support low-producing domestic and stock water wells that have relatively poor water quality from deep beneath the earth's surface (100's of feet).

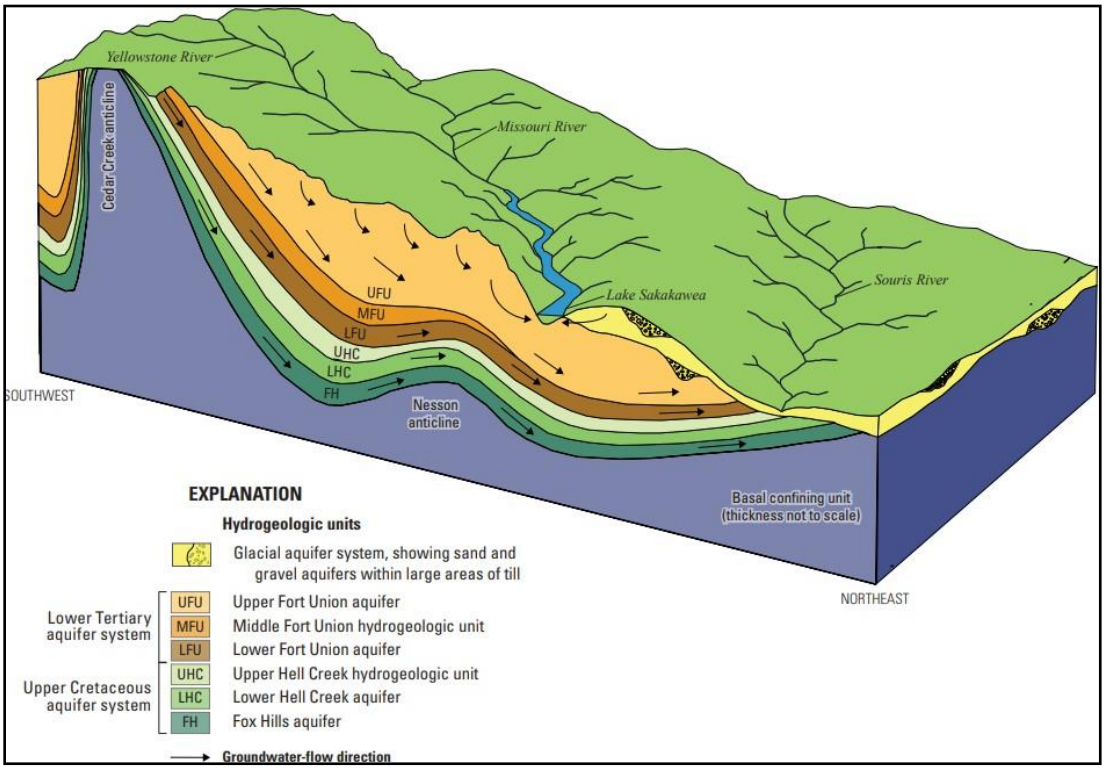
However, aquifers associated with preglacial alluvial channels are also an important source of water, especially in the non-glaciated areas of the Northern Great Plains. Similarly, alluvial terrace deposits associated with modern streams often provide groundwater for nearby domestic, stock, and municipal uses, especially along the Yellowstone and other larger rivers in the region. In fact, across the lease area, groundwater stored in modern alluvial stream deposits often represents the most reliably productive aquifers. This is noteworthy, as unconfined aquifers are also among the most susceptible to contamination because they tend to lack confining layers that would otherwise slow/halt the transmission of contaminates from the surface and shallow subsurface directly into the aquifer.

The Williston Basin aquifer is often divided into three units; the uppermost glacial till, lower Tertiary, and the Upper Cretaceous. These three aquifer systems cover 91,000 square miles throughout the Williston Basin with a maximum thickness of 2,900ft deep in the center and thinning towards the edge of the basin. It is underlaid by 800 – 3,000 feet of relatively impermeable marine shales that serve as the basal confining unit. The main components of recharge to groundwater are precipitation and infiltration from streams and reservoirs. Most groundwater discharge is to streams and reservoirs, groundwater pumping is a small part (less than 5 percent) but increasing withdrawals from 1960-2005 have caused groundwater levels to drop locally. (USGS Groundwater availability of the Williston Basin, 2018), (Potential effects of energy development on environmental resources of the Williston Basin in Montana, North Dakota, and South Dakota — Water resources: U.S. Geological Survey Scientific Investigations Report 2017–5070–C). (Potential effects of energy development on environmental resources of the Williston Basin in Montana, North Dakota, and South Dakota — Water resources: U.S. Geological Survey Scientific Investigations Report 2017–5070–C).

As of 2018 industrial water use which includes hydraulic stimulation made up 10.1% of all consumptive water use within North Dakota. North Dakota's Office of the State Engineer is responsible for managing the State's water resources as directed under Chapter 61-04 of North Dakota's Century Code, and Article 89-03 of the State Administrative Code. Water intended for hydraulic stimulation requires a temporary water permit which necessitates a point of diversion review by a state hydrologist which is either granted or denied based on Chapter 61-04-06. Temporary water permits and reviews are publicly available under the ND.GOV website (https://www.swc.nd.gov/reg_approp/waterpermits/)

In 2013 the North Dakota office of the State Engineer formalized a policy that restricted industrial uses from utilizing groundwater from the Fox Hills Aquifer. This policy had already been enforced on a case-by-case basis since the early 1980's. (Wanek 2009; pg.90) This aquifer has sufficient hydraulic head to naturally flow to the surface without the use of pumps. Ranchers have drilled approximately 500 wells into this aquifer to water livestock in the western part of North Dakota allowing the watering of livestock in areas with no electrical infrastructure. The rate of decline of hydraulic head has decreased at 1.5-3ft per year since 1995 centered in McKenzie County North Dakota. (Wanek 2009) In the next 100 years it is expected that the majority of these naturally flowing wells will cease to flow.

Figure 5 Groundwater aquifers and flow in the Williston Basin region (From Long et al., 2018)



BLM frequently receives comments asking for an alternative that would protect usable groundwater, defined under the Safe Drinking Water Act as an aquifer with water that contains less than 10,000 mg/L (10,000 ppm) of total dissolved solids. However, a separate alternative to protect usable groundwater is not warranted because protection of groundwater would be required for any APD that is approved on a lease parcel. Authorization of proposed projects would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection, and the BLM would deny any APD that proposes drilling and/or completion processes that are insufficient to protect of usable water, as required by 43 CFR § 3162.5-2(d). Any proposed drilling/completion activities would have to comply with Onshore Order No. 2, 43 CFR § 3160 regulations, and not result in a violation of a Federal and/or State laws that prohibit degradation of surface or groundwater quality.

Lease parcels for the September 2023 lease sale parcels within McKenzie County are within the Williston Basin development area.

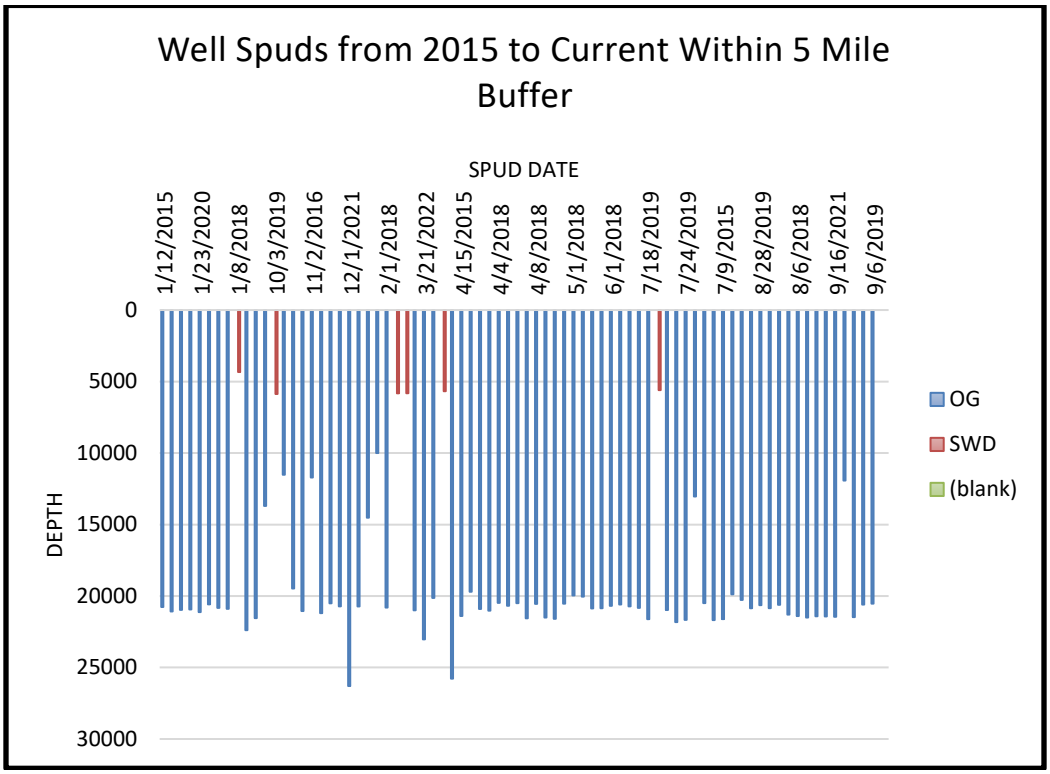
Williston Basin:

McKenzie County contains parcels included in the September 2023 lease sale. These parcels are within the Williston Basin unconventional Bakken/Three Forks development area. The probable development scenario is continued horizontal well development within the Bakken and Three Forks formations.

Due to the large number of wells and increasing activity in this area; only well data after 2014 was used to display in the graph. Older data was considered and looked at but the amount of development and focus on the Bakken and Red River since 2010 has not changed, and change is not foreseeable in the immediate future. **Figure 6** shows a large number of wells at >10,000ft measure depth. These are all horizontal Bakken Oil and Gas (OG), Three Forks, or Red River wells. There have also been wells drilled to

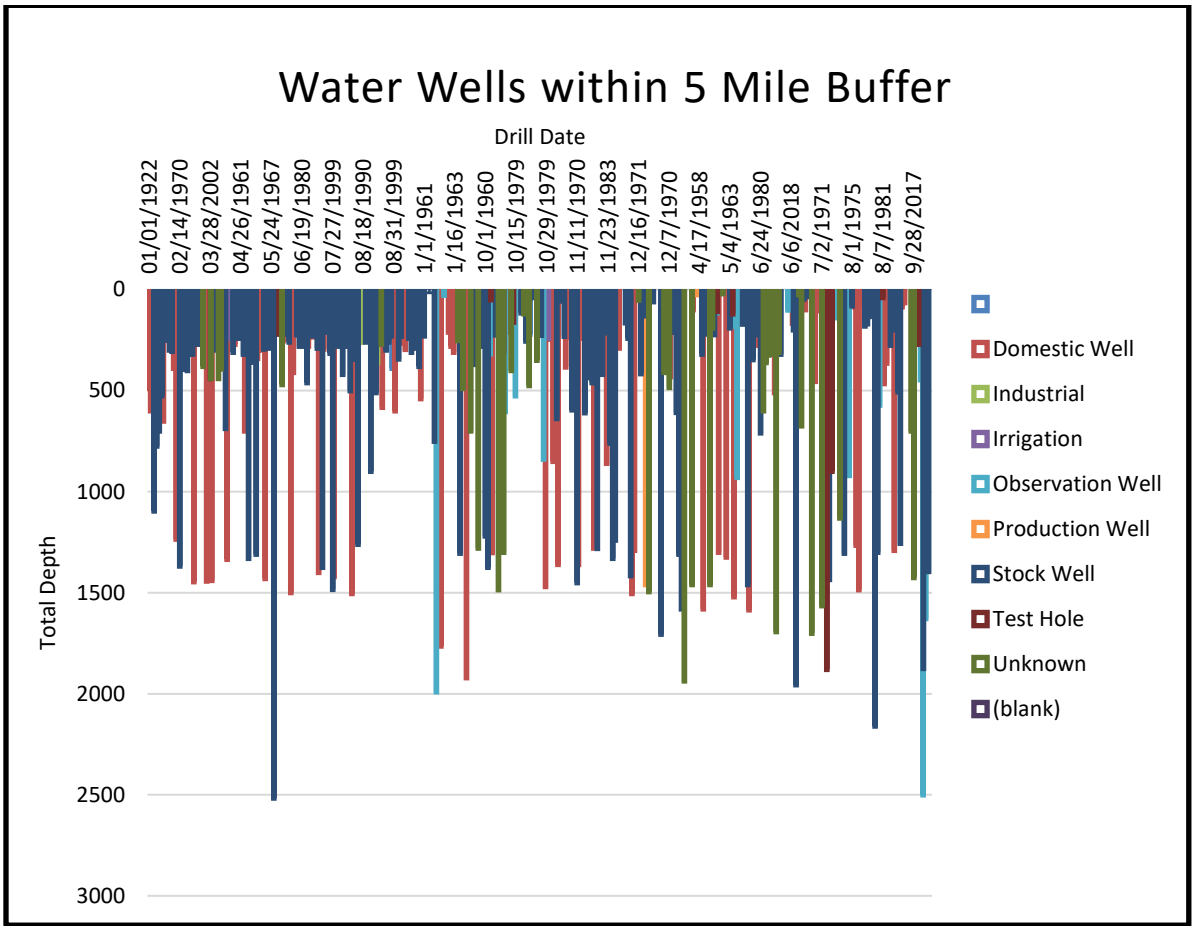
~5000ft that are used as saltwater disposal injection (SWD) wells into the Cretaceous sand intervals.

Figure 6. Graph of total depth of Oil and Gas wells within 5 miles of September 2023 parcels colored by use. The shallower wells at 5000'ft are used for saltwater disposal wells. Wells 10,000ft or deeper are targeting the Bakken/Three Forks formations or Red River



Water wells within 5 miles of these lease parcels are all <2500ft deep. **Figure 7** shows surrounding consumptive use groundwater wells are 1000's of feet shallower than the horizontal well development in Williston Basin.

Figure 7. Graph of total depth of Water wells within 5 miles of North Dakota lease parcels colored by use



Summary

The probable development scenario for the September 2023 lease sale for parcels in McKenzie County is horizontal unconventional wells into the Bakken, and Three Forks formations. This has been the predominate development scenario for the last 10 years and will likely continue. The Bakken, and Three Forks formations are all greater than 7000'ft deep while all the water wells used for consumptive use are shallower than 2500'ft deep. Between the water wells and oil producing horizons are layers of Cretaceous sands that are often used for saltwater disposal wells.

While there is sufficient vertical separation between existing groundwater wells and horizontal wells to make vertical fracture growth between the two zones highly unlikely, the higher permeability sands between the two zones makes the vertical propagation of hydraulic fluid past this zone even less likely. There is not a conflict between groundwater aquifers and horizontal well development due to hydraulic vertical fractures in this group of lease parcels.

3.6.2 Environmental Effects—No Action Alternative

There would be no impacts to groundwater or surface water resources from the No Action Alternative because no parcels would be offered for sale.

3.6.3 Environmental Effects— Proposed Action Alternative

Water Quality
Offering the parcels for lease would have no direct impact to surface or groundwater resources. Any potential effects on water from the sale of lease parcels would occur at the time the leases are developed (at the APD stage) and could be both short and long-term. Potential indirect and cumulative impacts from oil and gas leasing on water resources are also discussed in the applicable ARMP and FEIS for each field office and incorporated here by reference.

Some surface waters associated with the lease parcels are currently impaired from natural and anthropogenic features (see **Appendix H**). Natural features include Nitrogen, total dissolved solids (TDS), mercury, and an increase or decrease in specific conductivity because of background soil characteristics. Anthropogenic features include highways, roads, bridges; dams and impoundments that impact hydrostructure flow; agriculture, which contributed nutrients (N, P) to a water body; grazing, which can introduce pathogens (E. Coli) and/or physical alterations to a water body; and crop production that can affect the salinity, TDS, and sulfate levels of a water body.

Fluid mineral development could additionally affect water resources during exploration, drilling, production, and/or abandonment. The magnitude of these impacts would depend largely on the specific activity, season, proximity to waterbodies, location in the watershed, density of development, hydrogeologic characteristics of the affected area, effectiveness of mitigation, time until reclamation success, and characteristics of any hydrologically connected aquifers. Adherence to applicable regulations (i.e., Onshore Orders No. 1, 2 & 7; wastewater disposal, water right, and water quality laws, etc.), as well as stipulations regarding steep slopes, erosive soils, streams, waterbodies, floodplains, and wetlands would minimize impacts that may be associated with future development (see **Appendix A** and **B**). Alterations in watershed hydrology outside of the no surface occupancy zones could affect the water resources in these systems, but such impacts would likely be small and proportional to the footprint of the disturbance (noted below), relative to the size of the watershed in which the disturbance were to occur.

A Reasonably Foreseeable Development (RFD) scenario for oil and gas leasing at the plan level was analyzed in the RMP for the North Dakota field office. The BLM used the plan level RFD to develop an RFD for this lease sale, which is summarized in Chapter 2, shown here as **Table 19**, and further described in **Appendix D**. The associated estimates of surface disturbance relate to the potential scope and magnitude of impacts to surface hydrology and are used to provide context in this EA. The RFD for this lease sale estimates surface disturbance over the 10-year leases associated with the September 2023 lease sale as 56.8 short-term acres and 26 long-term acres.

Table 19. September 2023 Lease Sale: Parcels by County, Public Domain & Acquired Lands, Development Potential, and Estimated Surface Disturbance[1]

County	Alternative B				Development Potential	Estimated # of Wells	Estimate Acres of Surface Disturbance (short/long term)
	# Parcels	BLM Surface	Non-Federal Surface (Split Estate)	USFS Surface			
North Dakota Field Office							
McKenzie	32	0.00	0.00	10,735	3 - Moderate 11 – High 18 – Very High	12 oil	56.8 acres ST 26 acres LT
Total	**32**	**0.00**	**0.00**	**10,735**	3 – Moderate 11 – High 18 – Very High	12 oil	56.8 acres ST 26 acres LT
Grand Total	**32**	**10,735.00 Acres**					

[1]Total number of wells estimated based on the RFD and rounded to the nearest whole number

Produced water from conventional oil and gas development could impact the quality of surface water and groundwater through impoundments, injection, and discharge. Left untreated, produced water discharge and infiltration, or leaking produced water disposal pits could reach stream channels via subsurface flow, which could decrease water quality. Proper wastewater disposal methods, including siting and design of disposal pits in accordance with state and federal regulations, would minimize or avoid these impacts.

Underground injection control regulations would isolate injection zones from potentially useable aquifers, which would limit the potential for adverse impacts to surface or groundwater resources.

Standard stipulation STD 16-3 requires the Agency to furnish data on any special areas, which may include domestic water supplies within 1,000 feet of parcels and stipulates that surface use or occupancy will be controlled to prevent damage to surface or other resources.

The use of any specific water source on a federally administered well requires review and analysis of the proposal through the NEPA process, which will be completed at the APD stage. The Gold Book, Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (BLM and USFS 2007) would be followed, and site-specific mitigation measures, BMPs, and reclamation standards would be implemented and monitored to minimize effects to water resources. All proposed actions must comply with local, state, and federal regulations, including Montana and North Dakota water laws.

Surface Water

Future oil and gas exploration and development of a lease parcel could affect surface water resources by causing the removal of vegetation, soil compaction, and soil disturbance in uplands within the watershed. The potential effects from this are accelerated erosion, increased overland flow, decreased infiltration, increased water temperature, channelization, and water quality degradation associated with increased sedimentation, turbidity, nutrients, metals, and other pollutants. Erosion potential can be further increased in the long term by soil compaction and low permeability surfacing (e.g., roads and well pads), which increases the energy and amount of overland flow by decreasing infiltration, which in turn changes flow characteristics, reduces groundwater recharge, and increases sedimentation and erosion. As acres of surface disturbance increase within a watershed, however, effects on water resources could correspondingly increase. However, due to the footprint of disturbance associated with the RFD (56.8 acres short term disturbance, and 26.0 acres long-term disturbance over 32 parcels), these potential impacts to water resources are expected to be minor. Furthermore, site specific effects would be more fully analyzed upon receipt of an Application for a Permit to Drill and minimized through vegetation reestablishment and the application of BMPs to reduce erosion, and other conditions of approval.

Future oil and gas exploration and development of a lease parcel could result in spills or produced fluids that could potentially affect surface and/or groundwater resources in the short and/or long term. Oil and gas exploration/development could contaminate aquifers with salts, drilling fluids, fluids and gases from other formations, detergents, solvents, hydrocarbons, metals, naturally occurring radioactive materials, and nutrients; change vertical and horizontal aquifer permeability; and increase hydrologic communication with adjacent aquifers (EPA 2004). Spills of oil and brine continue to occur regularly.

From January 2022 through April 2023, ND Department of Environmental Quality reported 461 incidents that were not contained, for example, an overflow of the facility boundaries or a leak from a facility pipeline. The Department reported another 1006 incidents that were contained within the boundaries of the production or exploration facility during the same period. The ND Department of Environmental Quality receives their data was from the Oil and Gas Division whenever Oilfield Environmental Incident Report is filed. All spills are reported; volumes from 3 gallons to >300 bbls are listed. Spill materials include fluids (diesel, oil, produced water, frac fluids, fresh water), solids (bentonite), and gases (propane). Not all spills may reach or impact a drinking water resource. For example, on 10/03/2021, 220 barrels of brine

spilled onto a cultivated field 1320 feet from the nearest water well. Actions were taken to recover the fluid, and it was removed for disposal. The incident report notes that the produced water pooled within the field and that the area had been flagged for monitoring. The area was excavated and follow up readings will be taken as necessary to determine if any other actions will be needed (incident 764). All these incident reports are available online at: https://northdakota.hazconnect.com/ListIncidentPublic.aspx.

The size of the spill and site characteristics will influence whether a spill reaches a drinking water resource. Sandier soils and more permeable rock can increase the potential for spills to reach groundwater or migrate into surface water bodies. Spill prevention and response factors would be incorporated as Conditions of Approval at the APD stage and may reduce the frequency and severity of impacts to surface water resources from spills.

Groundwater

Potential effects to deeper aquifers may include cross-aquifer mixing through the wellbore or along fractures that extend between aquifers. All wells would be cased and cemented pursuant to North Dakota Department of Health (NDDH) rules, and Onshore Orders No. 1 & 2. All wells also would be constructed according to relevant NDDH regulations to prevent cross-aquifer contamination. There would be minor potential for commingling of waters during well construction if proper well drilling procedures and completion techniques are employed. Refer to **Appendix F**, Fracking White Paper, and **Appendix F2** (Bakken) for further discussion.

BLM reviewed existing groundwater and oil/gas well data to identify any multiple use conflicts between groundwater use and petroleum development around the lease acreage that is scheduled to be made available for fluid minerals development in the September 2023 lease auction. The large caveat to this assessment is that prior to lease sale, it cannot be guaranteed which geologic formation will be targeted in any one area. However, BLM can make an educated guess based on prior petroleum activity in the area.

BLM produced a series of maps for the proposed lease parcels showing the true vertical depth of surrounding oil and gas wells. There are points on each of these maps representing the location and depth of surrounding water wells. Refer to **Appendix G.**

Water Quantity

Oil and gas drilling operations could affect available quantities of surface water and groundwater, but are expected to be small, especially when compared to other consumptive water uses within the region. For example, while hydraulic fracturing uses billions of gallons of water every year at the national and state scales, when expressed relative to total water use or consumption, hydraulic fracturing generally accounts for only a small percentage, usually less than 1%. (USEPA, 2016, page 4-46).

The BLM estimated future water consumption associated with the September 2023 lease sale based on the sale specific RFD. The estimates were made with the following assumptions: (1) all wells ultimately put into production as a result of this lease sale utilize hydraulic fracturing, (2) the underlying factors used to estimate future development under the sale specific RFD scenario persist, and (3) actual water use per well is similar to the state median water use estimates as noted in **Appendix F**, Fracking White Paper. All estimates are approximate and could vary substantially based on site characteristics and other factors like the length of horizontal laterals and hydrocarbon extraction intensity.

If drilling technology improves and economic considerations increase the average lateral length of horizontal wells and hydrocarbon extraction intensity, future water use and wastewater production would likely correspondingly increase, as would the potential for adverse impacts to water resources.

While many areas within the lease sale are experiencing low or medium to high water stress and estimated water consumption associated with the RFD scenario is minor (relative to existing uses & available supply; see estimates below), some areas are experiencing high Baseline Water Stress. Areas with higher Baseline Water Stress would be more likely to experience depletion of surface and groundwater resources and/or competition among users from additional future development than areas with lower baseline water stress.

The potential for impacts associated with future development depends on the combination of water withdrawals and water availability at a given withdrawal location, as well as factors such as wastewater disposal methods and amounts. For example, where water withdrawals are relatively low compared to water availability, adverse impacts are unlikely to occur. Where water withdrawals are relatively high compared to water availability, impacts are more likely. Areas reliant on declining groundwater are particularly vulnerable to more frequent and severe impacts from cumulative water withdrawals, including withdrawals for hydraulic fracturing. Among surface water sources, smaller streams are more vulnerable to frequent and severe impacts from withdrawals. Seasonal or long-term drought can also make impacts more frequent and severe for surface water and groundwater sources.

Water withdrawals could lead to reduced aquifer water levels, reduced streamflow (through direct withdrawals or drawdown of aquifers that are hydraulically connected to nearby streams or springs), altered hydroperiods, and impacts to water quality parameters associated with stream flow. Typically, produced water from conventional oil and gas wells would originate from a depth below useable aquifers or coal seams and would be unlikely to adversely affect freshwater resources.

Potential site-specific effects would be analyzed at the time of a receipt of an Application for a Permit to Drill. In the event of exploration or development, site-specific mitigation measures would be identified to avoid or minimize potential impacts to water resources prior to land disturbance. Compliance with state regulations and implementation of BMPs and COAs at the APD stage would help minimize the impacts of water withdrawals on surface and groundwater by ensuring that water rights are established for all beneficial uses of water, ensuring that water resources are not over-appropriated, and considering the impacts of water withdrawals to groundwater wells and hydraulically connected surface waters. A lessee/operator would be required to obtain valid water rights from the states prior to operation, which would help to minimize the potential for impacts to the hydrologic system, other water users, and related ecological processes. Additional information on water rights and the availability of water resources in the project area can be obtained at the local North Dakota State Water Commission (NDSWC).

Cumulative Impacts

Given the limited disturbance estimated in the reasonably foreseeable development scenario (see Chapter 2, **Table 2**), the potential for future development associated with the September 2023 lease sale to contribute to the cumulative impacts of water resources is correspondingly limited and likely negligible (relative to other water uses and potential sources of contamination).

However, with more oil and gas wells being developed in proximity to fresh water, there is a potential for groundwater and surface water decline, as well as an increased possibility for nonpoint source pollution associated with ground disturbance to adversely affect water quality in receiving waterbodies. The vulnerability of the decline and related impacts to existing water users and environmental processes is directly associated with the water need, the quantity and quality of the groundwater, and the cumulative withdrawals and is likely correlated to existing and predicted Baseline Water Stress within the potentially affected basins. Water used to develop any of the proposed parcels could have a cumulative depletion effect, especially if other oil and gas development and regional water uses exceed recharge rates in the basins, potentially affecting surface flows and groundwater elevations. Such effects could be exacerbated during periods of drought. BMPs to reduce runoff, erosion, and potentially associated nonpoint source

pollution to downstream waterbodies would minimize cumulative effects to water quality.

Groundwater recharge rates can be extremely low, and groundwater pumping can exceed recharge rates in many areas of the country (Konikow, 2013). Cumulative drawdowns can affect surface waterbodies since groundwater can be the source of base flow in streams and alter groundwater quality by mobilizing chemicals from geologic sources, among other means (DeSimone et al., 2014).

Aquifers can be affected directly and indirectly by increasing the number of wells in an area. Direct impacts are a result of direct use of the groundwater. Indirect ramifications could result from declines in surface water resources (or vice versa) which could lead to increased groundwater withdrawals and net cumulative depletions of groundwater (Castle et al., 2014; Georgakakos et al., 2014; Konikow, 2013; Famiglietti et al., 2011).

It should be noted that cumulative impacts on water quality findings associated with hydraulic fracturing appear inconclusive at this time, but localized impacts to surface water quality associated with dense surface disturbance have been observed elsewhere. However, it has been observed that pumping can promote changes in reduction-oxidation (redox) conditions and thereby mobilize chemicals from geologic sources (DeSimone et al., 2014). Similar patterns of groundwater quality degradation associated with prolonged aquifer depletion (i.e., salinization and contamination) have also been observed. (U.S. Environmental Protection Agency; 2016a).

As studies are conducted and ramifications are analyzed they will be instrumental in developing better science to determine cumulative impacts to the environment. When the science of these studies is complete, they will be incorporated to the analysis of oil and gas lease sales to determine the best course of action according to the science.

4 Consultation and Coordination

4.1 Summary of Consultation and Coordination

The BLM coordinates with Montana Fish, Wildlife, and Parks (MTFWP), North Dakota Game and Fish (NDGF) and the U.S. Fish and Wildlife Service (USFWS) to identify wildlife concerns, protective measures, and apply stipulations and lease notices associated with oil and gas lease sales. While the BLM manages habitat on BLM lands, the state agencies are responsible for managing all wildlife species populations. The USFWS also manages some wildlife populations but only those federal trust species managed under mandates such as the Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. The BLM mailed letters to MTFWP, NDGF, and USFWS informing them of scoping and EA comment periods. The BLM also communicated informally with MTFWP and NDGF. No scoping comments were received from USFWS.

The BLM consults with Native Americans under various statutes, regulations, and executive orders, including the American Indian Religious Freedom Act, the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, the National Environmental Policy Act, and Executive Order 13175-Consultation and Coordination with Indian Tribal Governments. The BLM notified consulting tribes of the oil and gas lease sale and invited them to identify any issues or concerns that the BLM should consider in this EA. Tribal consultation is on-going throughout this process.

The BLM coordinates with the USFS DPG McKenzie and Medora Ranger Districts to identify resource concerns and apply stipulations and lease notices to lease parcels proposed within the administrative boundary of the DPG McKenzie Ranger District. Refer to **Table 20** for the list of Tribes and Agencies

contacted.

Table 20. Tribes, Agencies, and Interested Parties Contacted

Tribe or Agency	Title	Name
Assiniboine Tribe	Buffalo Chaser's Society	John Allen Jr.
Blackfeet Nation	BIA Superintendent	Thedis Crowe
Blackfeet Nation	THPO	John Murray
Blackfeet Tribe	Chairman	Tim Davis
Cheyenne River Sioux Tribe	THPO	Steve Vance
Cheyenne River Sioux Tribe	Tribal Chairman	Harold Frazier
Chippewa Cree Tribe	BIA Field Representative	Mamie Stump
Chippewa Cree Tribe	THPO	Jonathan Windy Boy
Chippewa Cree Tribe	Tribal Chairman	Harlan Baker
Comanche Nation	Chairman	William Nelson Sr.
Comanche Nation	THPO	Martina Callahan
Confederated Salish & Kootenai Tribes	Chairman	Tom McDonald
Confederated Salish & Kootenai Tribes	THPO	
Confederated Salish & Kootenai Tribes	Tribal Preservation Specialist	Mike Durglo
Confederated Tribe of the Umatilla Indian Reservation	Chairman	Lindsey X Walkman
Confederated Tribe of the Umatilla Indian Reservation	THPO	Carey Miller
Confederated Tribes of the Colville Indian Reservation	Chairman	Marvin Kheel
Confederated Tribes of the Colville Indian Reservation	THPO	Guy Moura
Crow Creek Sioux Tribe	Chairperson	Peter Lengkeek
Crow Creek Sioux Tribe	THPO	Merle Marks
Crow Tribe	BIA Superintendent	Vianna Stewart
Crow Tribe	Chairman	Frank White Clay
Crow Tribe	THPO	Aaron Brien
Eastern Shoshone Tribe	BIA Superintendent	Norma Gourneau
Eastern Shoshone Tribe	Chairman	John St. Claire
Eastern Shoshone Tribe	THPO	Josh Mann
Flandreau Santee Sioux Tribe	President	Anthony Reider
Flandreau Santee Sioux Tribe	THPO	Gerrie Kills A Hundred
Fort Belknap Tribe	Acting THPO	Michael J. Black Wolf
Fort Belknap Tribe	BIA Superintendent	Mark Azure
Fort Belknap Tribe	Environmental Protection Manager	Ina Nez Perce
Fort Belknap Tribe	White Clay Society	Morris Belgard

Fort Peck Tribe	BIA Superintendent	Howard Bemer
Fort Peck Tribe	Chairman	Floyd Azure
Fort Peck Tribe	THPO	Dyan Youpee
Ft. Belknap Tribe	CAO	Delina Cuts The Rope
Ft. Belknap Tribe	President	Jeffery Stiffarm
Kiowa Nation	Chairman	Matthew Komalty
Kiowa Nation	THPO(Acting)	Dewey Tsonetonkoy Sr.
Little Shell Chippewa Tribe	Chairman	Gerald Gray
Little Shell Chippewa Tribe	THPO	Dwayne Reid
Lower Brule Sioux Tribe	Chairman	Clyde Estes
Lower Brule Sioux Tribe	Cultural Resources	Claire Green
Lower Sioux Indian Community	President	Robert Larson
Lower Sioux Indian Community	THPO	Cheyanne St. John
Nez Perce Tribe	Chairman	Samuel N. Penney
Nez Perce Tribe	THPO	Keith "Pat" Baird
Nez Perce Tribe	Tribal Archaeologist	Josiah Pinkham
Northern Arapaho Nation	Chairman	Jordan Dresser
Northern Arapaho Nation	THPO	Crystal Cbearing
Northern Cheyenne Tribe	BIA Superintendent	Michael Addy
Northern Cheyenne Tribe	Vice President	Serena Wietherelt
Northern Cheyenne Tribe	THPO	Teanna Limpy
Oglala Sioux Tribe	President	Kevin Killer
Oglala Sioux Tribe	Project Coordination	Thomas Brings
Rosebud Sioux Tribe	President	Scott Herman
Rosebud Sioux Tribe	THPO	Ione Quigley
Santee Sioux Tribe of Nebraska	Chairman	Roger Trudell
Santee Sioux Tribe of Nebraska	THPO	Joseph Moose
Shoshone-Bannock Tribes Fort Hall Reservation	Chairman	Devin Boyer
Shoshone-Bannock Tribes Fort Hall Reservation	Cultural Resources Director	Louise E. Dixey
Shoshone-Bannock Tribes Fort Hall Reservation	Environmental Program Manager	Christina Cuttler
Sisseton-Wahpeton Oyate Tribe	Chairman	Delbert Hopkins
Sisseton-Wahpeton Oyate Tribe	THPO	Dianne Desrosiers
Spirit Lake Sioux Tribe	Chairman	Douglas Yankton Sr.
Spirit Lake Sioux Tribe	THPO	Kenny (KJ) Gray Water
Standing Rock Sioux Tribe	Chairman	Janet Alkire
Standing Rock Sioux Tribe	THPO	Jon Eagle
Three Affiliated Tribes	Chairman	Mark Fox
Three Affiliated Tribes	THPO	Allen Demaray

Turtle Mountain Band of Chippewa	Chairman	Jamie Azure
Turtle Mountain Band of Chippewa	THPO	Jeff Desjarlais Jr.
Yankton-Sioux Tribe	Chairperson	Robert Flying Hawk
Yankton-Sioux Tribe	THPO	Kip Spotted Eagle
North Blaine Cooperative State Gazing Distrcit		Cheryl Schuldt
DNRC-Eastern Land Office		Chris Pileski
Dept. of Env. Quality		Christopher Dorrington
DNRC MT board of O&G		Tom Richmond
EPA Region 8 NEPA Program		Amelia Platt
Ft. Peck Army Corps of Engineers		Darin McMuriy
Div of Ecological Services		Jodi Bush
USFS NPNHT CMP		Julie Molzahn
LCTHF Executive Director		Lindy Hatcher
Lewis & Clark National Historic Trail		Denise Nelson
Mariah Energy		Lenny Behm
Montana DNRC		
Trust Land Management HQ		Montana DNRC
Montana Historical Society		Dr. Mark Baumler
Montana Trout Unlimited		
Montana Wilderness Association		
MT Preservation Alliance		Chere Justio
National Wildlife Federation Northern Rockies Proj. Office		
North Dakota Dept of Trust Lands		
Northern Plains Resource Council		Adam Haight
Public Lands Solutions		Jason Keith

Representative		Ray Shaw
USFS NPNHT PAO		Roger M. Peterson
USFS NPNHT Admin.		Sandi McFarland
South Dakota Dept. of Game, Fish and Parks		
State Historical Society of ND		Claudia Berg
Theodore Roosevelt National Park		Heidi Riddle
US Environ. Protection Agency Reg 8 Helena office		
MT. Env. Info. Center		
Theodore Roosevelt Conservation Partnership		
Center for Biological Diversity		Randi Spivak
Earthjustice Rocky Mountain		
ConocoPhillips Company		Pushpa Nellikkattil
ND Game and Fish		Patrick T. Isakson
Western Env. Law Center		Morgan O'Grady
Friends of the Earth		Nicole Ghio
North Dakota Office		USFWS
Western Energy Alliance		Esther Wagner
Army Corps of Engineers		Omaha District
MT Fish, Wildlife, and Parks		Deb O'Neill
Montana Environmental Information Center		Derf Johnson
Little Missouri National Grassland		Cale Bickerdyke
The Wilderness Society		Ben Tettlebaum

4.2 Summary of Public Participation

Public scoping for this project was conducted through a 30-day scoping period from March 31 to May 1, 2023, as described in a Press Release issued by the Montana/Dakotas State Office,

advertised on the BLM Montana/Dakotas State Office website, and posted online in the BLM NEPA e-Planning website. The BLM also mailed letters to local, state, and federal agencies, Tribal entities, and private surface owners informing them of the lease sale and seeking comments. The mailing list is included in the project record.

A 30-day public comment period us upcoming from May 26 to June 25, 2023, as described in a Press Release issued by the Montana/Dakotas State Office, advertised on the BLM Montana/Dakotas State Office website, and posted online in the BLM NEPA e-Planning website. The BLM also mailed letters to local, state, and federal agencies, Tribal entities, and private surface owners informing them of the lease sale and seeking comments. The mailing list is included in the project record and can be viewed in **Table 20**.

4.2.1 Section 208 Report

In November 2021, the Department of the Interior released a Report on the Federal Oil and Gas Leasing Program (Report). The Report made specific recommendations to address documented deficiencies in the program to meet three programmatic goals:

- Providing a fair return to the American public and States from Federal management of public lands and waters, including for development of energy resources;
- Designing more responsible leasing and development processes that prioritize areas that are most suitable for development and ensure lessees and operators have the financial and technical capacity to comply with all applicable laws and regulations; and
- Creating a more transparent, inclusive, and just approach to leasing and permitting that provides meaningful opportunity for public engagement and Tribal consultation.

The Report also recommends: As an overarching policy, BLM should ensure that oil and gas is not prioritized over other land uses, consistent with BLM's mandate of multiple-use and sustained yield. The BLM should carefully consider what lands make the most sense to lease in terms of expected yields of oil and gas, prospects of earning a fair return for U.S. taxpayers, and conflicts with other uses, such as outdoor recreation and wildlife habitat. The BLM should always ensure it is considering the views of local communities, Tribes, businesses, State and local governments, and other stakeholders. While the leasing decisions for this lease sale result from the BLM's exercise of its discretion based on its analysis and review of the record, they are also consistent with the recommendations in the Report, as well as numerous reports issued by the Governmental Accountability Office and Congressional Budget Office, including: ensuring public participation and Tribal consultation, addressing conflicts with other resources, avoiding lands with low potential for oil and gas development, focusing leasing near existing development and ensuring a fair return to taxpayers.

This lease sale and NEPA process have or will have included a 30-day scoping period, 30-day comment period on the EA and 30-day protest period. The BLM has also ensured applicable Tribal consultation is current. The BLM's leasing decisions consider comments received during this process and will further evaluate points raised in any protests received. As a result of public comments received on the sale and consistent with recommendations in the November 2021 report, BLM undertook additional review and has not identified any additional parcels which warrant deferral. Details of this review is included in **Appendix J**.

5 List of Preparers

Table 21. List of Preparers

Name	Title	Resource Area
Craig Miller	Biologist	Wildlife, Listed Species
Cale Bickerdyke	Mineral and Lands Supervisor, USFS	USFS DPG Coordination
Dan Brunkhorst	Planning and Environmental Specialist	NEPA Coordination
Josh Buckmaster	Soil Scientist	Soil Resources
Josh Chase	Archeologist	Cultural Resources
Tyler Croft	Petroleum Engineer	Water Resources
Peter Davis	Petroleum Engineer	Reasonably Foreseeable Development Scenario
Greg Liggett	Geologist (Paleontology)	Paleontology
Mark Robillard	Petroleum Engineer	Reasonably Foreseeable Development Scenario
Marcus Lorusso	GIS Specialist	GIS
Jessica McDermott	Geospatial Ecologist	Big Game, Greater Sage-grouse
Fiona Petersen	Wildlife Biologist	Wildlife, Listed Species
Mark Peterson	Air Resources Specialist	Air Resources, GHG Emissions
Reyer Rens	Supervisory Rangeland Management Specialist	Range, Livestock Grazing
Scott Rickard	Economist	Socioeconomics, Environmental Justice
Christina Stuart	Fish Biologist	Fisheries, Listed Species
CJ Truesdale	Lead Archaeologist	Cultural Resources
Kent Undlin	Wildlife Biologist	Wildlife, Listed Species
Tessa Wallace	Physical Scientist	Project Lead and Coordination, Editor Environmental Justice and Human Health
Kathy Tribby	Biologist	Wildlife, Listed Species
Matt Comer	Biologist	Wildlife, Listed Species
Dave Wood	Wildlife Biologist	Wildlife, Listed Species (Greater Sage-grouse)
Karsyn Lamb	Economist	Environmental Justice and Human Health

6 Table of Issues and Resources Considered

Table 22. Issues and Resources Considered

Determination*	Issue	Rationale for Determination
NI	Access	No issues from act of leasing.
PI	Air Quality	Potential impacts; will be analyzed.
NP	Areas of Critical Environmental Concern	Not present per review of GIS data.
NP	Backcountry Conservation Areas	Not present per review of GIS data.
PI	Climate	Potential impacts; will be analyzed.
NI	Cultural Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
PI	Environmental Justice	Potential impacts; will be analyzed.
NP	Farmlands (Prime or Unique)	Not present per review of GIS data.
NI	Fire Management	No issues from act of leasing.
NI	Fish Habitat	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Floodplains	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Forests and Rangelands	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Forestry Resources and Woodland Products	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
PI	Greenhouse Gases and Climate	Potential impacts; will be analyzed.
PI	Human health and safety concerns	Potential impacts; will be analyzed.
NI	Invasive, Non-native Species	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Lands and Realty	The act of leasing is in accordance with current management plans and is consistent with current land use.
NP	Lands with Wilderness Characteristics	Not present per review of GIS data.
NI	Livestock Grazing Management	No issues from act of leasing.
NI	Migratory Birds	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Native American Religious Concerns	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Noise Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Paleontological Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.

Determination*	Issue	Rationale for Determination
NI	Recreation Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NP	Sage Grouse Habitat	Not present per review of GIS and literary data.
PI	Socioeconomics	Potential impacts; will be analyzed.
NI	Soils	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Threatened, Endangered or Candidate Plant or Animal Species	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Vegetation	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Visual Resources	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NI	Wastes, Hazardous or Solid	No issues from act of leasing. Stipulation application and regulatory requirements will adequately mitigate potential impacts at APD stage.
PI	Water	Potential impacts; will be analyzed.
NI	Wetlands/Riparian Zones	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.
NP	Wild Horses and Burros	Not present per review of GIS data.
NI	Wild and Scenic Rivers	Not present per review of GIS data.
NP	Wilderness and Wilderness Study Areas	Not present per review of GIS data.
NI	Wildlife	No issues from act of leasing. Stipulation application will adequately mitigate potential impacts at APD stage.

*NP = not present in the area impacted by the proposed or alternative actions.

NI = present, but not affected to a degree that detailed analysis is required.

PI = present and may be impacted. Will be analyzed in affected environment and environmental effects. For consistency, the term ‘effects’ is used throughout the EA, but we use the term ‘impacts’ just in this table. (NOTE: PI does not necessarily mean effects are likely to be significant, only that there are effects to this issue, resource, or use. Significance will be determined through analysis and documented in a Finding of No Significant Impact or Environmental Impact Statement.)

7 Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
AERMOD	American Meteorological Society / EPA Regulatory Model
APA	Administrative Procedures Act
APD	Application for Permit to Drill
AQRV	Air Quality Related Value
ARMP	Approved Resource Management Plan
ARPA	Archeological Resources Protection Act
ARTSD	Air Resource Technical Support Document
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
BOR	Bureau of Reclamation
BTV	Blue-tongue Virus
CAA	Clean Air Act
CALPUFF	California Puff Model
CAP	Criteria Air Pollutant
CBNG	Coal Bed Natural Gas
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO_2eq	Carbon Dioxide Equivalent
COA	Condition of Approval
CSU	Controlled Surface Use
DEQ	Department of Environmental Quality
DM	Departmental Manual
DoAQ	Division of Air Quality
DPG	Dakota Prairie Grasslands
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EOI	Expression of Interest
EOR	Enhanced Oil Recovery
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESD	Ecological Site Description
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FLIGHT	Facility Level Information on Greenhouse Gas Tool
FLIR	Forward Looking Infrared
FLPMA	Federal Land Policy Management Act of 1976, as amended
FONSI	Finding of No Significant Impact
FOOGLRA	Federal Onshore Oil and Gas Leasing Reform Act of 1987
GHG	Greenhouse Gas
GHMA	General Habitat Management Area

GIS	Geographic Information Systems
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HD	Hunting District
HMA	Herd Management Area
HQT	Habitat Quantification Tool Technical Manual
IB	Information Bulletin
IBLA	Interior Board of Land Appeals
IDT	Interdisciplinary Team
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
KOP	Key Observation Point
LN	Lease Notice
LTA	Long-Term Averages
MAAT	Mean Annual Air Temperature
MACT	Maximum Achievable Control Technologies
MAF	Master Address File
MAP	Mean Annual Precipitation
MBOGC	Montana Board of Oil and Gas Conservation
MBTA	Migratory Bird Treaty Act of 1918
MCFO	Miles City Field Office
MDEQ	Montana Department of Environmental Quality
MDNRC	Montana Department of Natural Resources and Conservation
MFP	Management Framework Plan
MLA	Mineral Leasing Act
MMT	Million Metric Tons
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSGOT	Montana Sage Grouse Oversight Team
MTDB	MAF/TIGER Database
MTFWP	MT Fish, Wildlife and Parks
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NDDH	North Dakota Department of Health
NDFO	North Dakota Field Office
NDGF	North Dakota Game and Fish
NDSWC	North Dakota State Water Commission
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NHT	National Historic Trails
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NSPS	New Source Performance Standards
OHV	Off-Highway Vehicle
PEIS	Programmatic Environmental Impact Statement
PFC	Proper Functioning Condition
PGM	Photochemical Grid Modeling

PHMA	Priority Habitat Management Area
P.L.	Public Law
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
RAC	Resource Advisory Council
RFD	Reasonably Foreseeable Development
RFFA	Reasonably Foreseeable Future Action
RHMA	Restoration Habitat Management Area
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
ROD	Record of Decision
ROW	Right-of-way
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SRP	Special Recreation Permit
T&E	Threatened and Endangered
TIGER	Topologically Integrated Geographic Encoding and Referencing
TL	Timing Limitation
TRNP	Theodore Roosevelt National Park
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USDOI	U.S. Department of the Interior
USFS	U.S. Department of Agriculture Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
VOC	Volatile Organic Compound
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WEM	Waivers, Exceptions, or Modifications
WHB	Wild Horse and Burro
WO	Washington Office
WSA	Wilderness Study Area

8 List of References

8.1 General References

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8.2 BLM Planning References

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8.3 Air Resources

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